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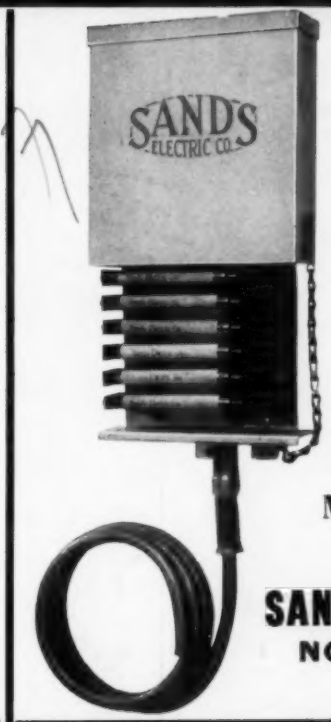

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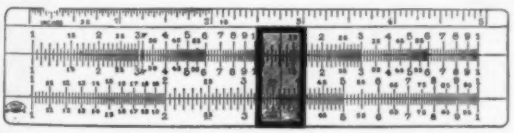

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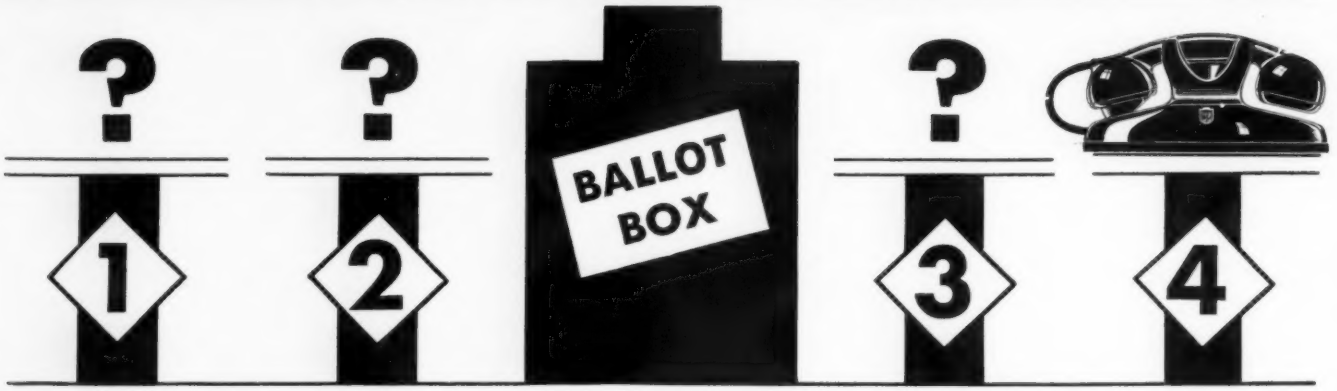

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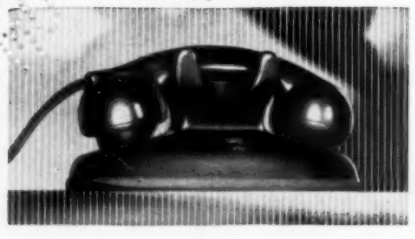

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Telephone Engineer

The International Technical Journal

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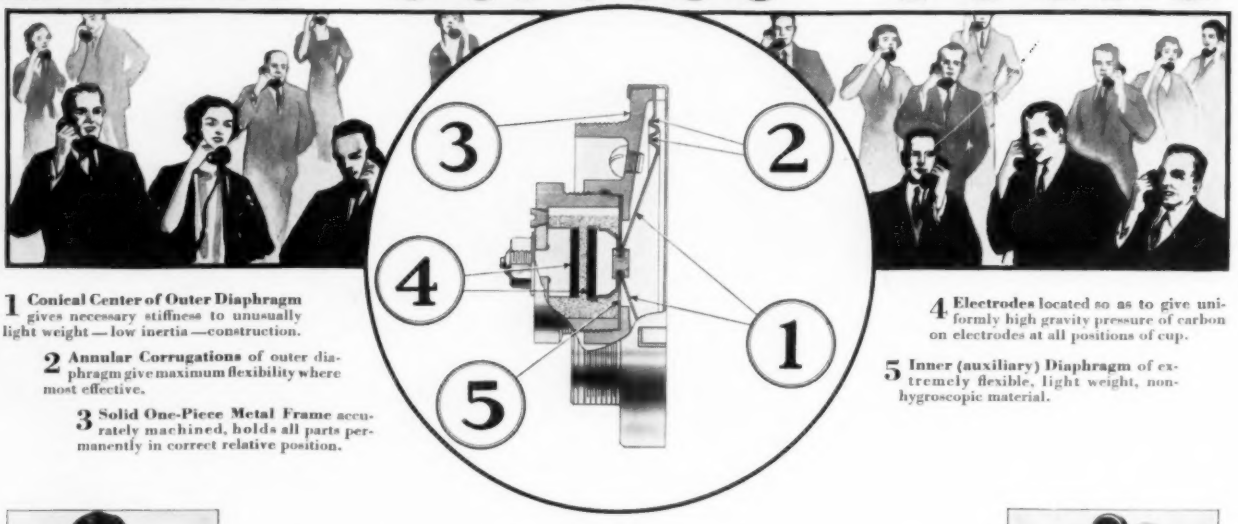

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1934—The **COMING OUT** Year

WE SINCERELY believe that telephone men can look to this year as a more prosperous telephone year. The government's activities to put more money into circulation, renewed paying of dividends by more industrial concerns, reports of last quarter profits in 1933 all go to indicate that better times are on the way.

So far these activities have produced an increase in telephone installations and as they continue more telephones will be placed back into service.

In our mind the recent report of the A. T. & T. Co. is an indicator that there is a substantial pickup in general business throughout the country.

In reporting station gains in the entire Bell System for the month of November, the company states that while the gain in net telephone connections for the system in November, amounting to between 5,000 and 6,000 units, was considerably smaller than in either of the two preceding months, it came as a pleasant surprise in view of the fact that the New York Telephone company, which operates about 20 per cent of the Bell system telephones, as well as other important American Telephone affiliates, reported decreases in active telephones for November.

This means that improvements in the companies operating in other parts of the country conteracted the tendency toward curtailment in the New York area and permitted the moderate net gain for the system as a whole. No one will argue that this is not a more healthy condition than if the gain came from just one section of the country.

Certainly all present outward indications point to general business improvement and out of this improvement telephone men can face 1934 with logical reasons to expect a greater telephone business.

We are moving forward.

R. C. Reno

EDITOR

The Telephone Business As We See It

Market of Small Exchanges During the past year or two there seems to have been more of a tendency for telephone leaders—both operators and manufacturers—to look into the future of the telephone business and to work out plans which will maintain the industry on the same progressive basis, on which it has operated for decades.

In some quarters it is thought that what the industry needs is more home-owned or individually-owned telephone exchanges of which the owner is the manager.

Indications are that there are many plants which could and probably would be transferred to individual owners because it is no secret that quite a few small exchanges have proved to be unprofitable and undesirable units of syndicate systems and no doubt syndicates would favor selling them, providing the buyers were good reliable and experienced telephone men.

Then, too, there are many small properties which are members of syndicates now in receiverships, which, if they could be sold, would reduce the liabilities of the receivers.

In addition to these companies, no doubt there are quite a few small individually-owned Independent plants now on the verge of being offered for sale, which telephone men wishing to acquire properties could purchase.

As for buyers, it is our opinion that probably there are quite a number of experienced telephone men, many of whom are former telephone property owners, who have been thrown out of work because of necessary retrenchment programs of syndicate and other companies that would like to operate their own telephone properties.

A movement of this kind would help syndicates and other telephone owners solve some of their problems and at the same time it would provide opportunities to those qualified telephone men, who have spent their lives in the business, to operate their own plants. We believe it would have a favorable overall effect on the Independent telephone industry.

▲ ▲ ▲

Monopoly in Communications While there has been extensive newspaper publicity on the preliminary report from the Interdepartmental Communications Committee of the Department of Commerce, recommending the organization of a Federal communications commission, which would provide for monopoly in each of the three lines of communications—telephone, telegraph and radio—we are of the opinion that it is too early to predict just how far this recommendation will get with the National Administration.

It is our belief that no definite opinion can be formed as to any changes that will affect the telephone industry until the President makes a statement regarding the report, which is now in his hands or until the trend of Congress is revealed.

If, and when the government advocates any action which is believed to be detrimental to the telephone industry by its interests, TELEPHONE ENGINEER will offer the industry its facilities and cooperation in opposing this action.

▲ ▲ ▲

It Takes Steady Plugging "But it sure took steady plugging." This was the comment that the manager of a Pennsylvania company made when he reported favorable results of a telephone selling campaign to the Pennsylvania State Telephone and Traffic Association recently.

Speaking of sales campaigns the Pennsylvania Association Bulletin says:

"Signs of encouragement are still evident in all departments of our industry. When we speak of our industry we refer to it as a whole and not of any one group or territory. From many parts of the state come reports of successful selling campaigns which have yielded a return far beyond the anticipations of the company. The manager of one of the districts of one of our largest Independent companies tells me that he has shown a net gain in stations for each of the past twelve months. 'But it sure took some steady plugging,' was his comment.

"In that remark you can find the answer to the success or failure of any company. Steady plugging for reconnects, steady plugging for new stations, steady plugging for toll business, will bring substantial returns in increased revenue. A review of several 30-day campaigns shows that about 5 per cent of your prospects can be sold. That means 5 in each 100, 50 in each 1,000 or 500 in each 10,000. That means hard work, steady plugging, but it pays big."

Sales campaigns will bring new business for any telephone operating company if it is ready and willing to do that necessary STEADY PLUGGING.

The Bulletin also reports that toll business and collections are improving—and states that it also is the result of good old steady plugging.

ECONOMY IN BUYING GOOD DROP WIRE

Wise Spending Is Just as Essential as Wise Saving — Correct Installation of Drop Wire Lengthens Service Life — Pointers on Inspecting and Comparing Grades of Drop Wire — False Economy of Buying on Price Basis Instead of Quality Basis.

By

T. DeWITT TALMAGE

TWO hundred years ago Benjamin Franklin issued the first of a long series of "Poor Richard's Almanacks." These quaint publications were famous for their homely maxims advocating industry and frugality. Poor Richard's proverbs, however, preached more than pinch-penny penuriousness. They taught wise spending as well as wise saving.

Poor Richard counseled that neither time, energy nor money be spent except for that which well repays its cost in real value received. By converting thousands of readers to this homely philosophy, they had a profound and lasting effect on American social and business life.

It is disturbing to observe that this admirable effect seems to be wearing away in some quarters and is totally absent in other quarters due to short-sighted policies and amateur thrift. For example, some telephone companies have purchased cheap dry cells that wear out in a relatively short time. Then they buy still more cheap dry cells to replace those worn out and forget to add up the total cost of these economies. Often such companies have a "show piece" of economy, some bargain in line wire, cable or piece of inside equipment. While their right hand clutches at dollars thriftly, they spend sloppily with the left.

Spend for Real Value

In good times or bad times, wise men spend their money only in exchange for real value. Whatever finds a market with them must prove its worth. Like any other material that is used in the telephone plant, outside distributing wire or drop wire should combine the qualities of service and economy. Drop wire that is purchased at a low initial cost is not necessarily economical, for it may be short lived, which may make it very expensive in the long run.

Outside distributing wire is used in stringing "drops" which extend the telephone circuit from the open wire leads or distributing cable terminals to the subscriber's station. Drop wire consists of two separately rubber-compound insulated conductors, each covered with a protective coating of closely woven cotton braid which is given a weatherproof finish, and then twisted together into what is termed a twisted pair. Drop wire may also be secured in a parallel lay.

Lengthening the service life of drop wire works to reduce the annual cost of this material. For maximum life, drop wire must be well made of the best grade of materials, and the finished product must be installed in accordance with accepted practices. A high-grade drop wire carelessly installed may not give as satisfactory service as a mediocre grade of wire which has been properly installed.

Tree Interference

One of the common causes for failure of drop wire to give long, trouble-free service is abrasion of the insulation by tree interference. The remedy is quite obvious: Trim interfering growth or reroute the drop. Where neither of these methods can be followed, tree guards may be used or a special type of drop wire, known as resistant braid or abrasion proof wire, may be installed. In some cases both tree guards and resistant braid wire may be necessary.

Abraided lengths of drop wire should be cut out and new pieces spliced in the drop. While continuous lengths of drop wire are preferable in a drop, economy of material demands that splices be made. Properly prepared splices will cause no trouble. Some companies limit the number of splices to two in any one drop of ordinary length. Avoid using cheap household friction tape in wrapping staggered splices in drop wire.

Method of Splicing

For best results in splicing drop wire, cover each joint with two wrappings of a high grade rubber splicing tape three-quarters of an inch in width put on in reverse layers with an overlap equal to one-half the width of the tape. Then over this rubber tape, wrap two layers of a good grade of friction tape in a similar manner and extend this second wrapping about one-half inch beyond each end of the rubber tape. A friction tape which passes the United States Government Navy Specifications No. 17T-6D is to be preferred.

It is a questionable practice to skimp on the number of porcelain knobs or supporting fixtures as this only serves to endanger stability of the drop. Excessively long spans should be avoided. Where an existing span is excessive and slack due to stretching of wire is encountered, an intermediate support should be placed in the span or a higher strength wire should be installed. Loose fixtures should be promptly tightened. Broken knobs or fixtures should be immediately replaced.

Porcelain knobs or other dead-ending fixtures should be of double groove variety for use with twisted-pair drop wire. In making the dead-end tie to these insulators the two separate grooves are intended to hold separately the two wires of the pair. The two wires should not cross each other in passing around the grooves. In other words, the two wires should be untwisted and arranged parallel with each other as they are tied in the grooves.

How to Tie to Knobs

Much drop wire trouble is caused by improperly tying the wires to the knobs. Drop wire ties at dead-end points, corner knobs and intermediate knobs requiring a straight tie should be carefully made in a proper manner. The workman will do well to take his time on this class of work and do the job right in the first place. Loose ties or improperly made ties resulting from sloppy work of a hurrying lineman cause many otherwise needless repair trips due to slipping of the drop, cutting of insulation and like faults. We are only kidding ourselves when we do tying-in work in a half-way manner.

Trouble at dead-end points can be reduced by using drop wire clamps instead of the usual hand-made ties. There are several styles of these clamps now available. The Kearney drop wire dead-ending tie is formed from Copperweld wire having a tensile strength of 710 pounds. The load is distributed over four inches of wire, hence the pressure is not excessive at any one point.

Another type of dead-ending clamp which is easily and quickly installed is a two-piece device consisting of a tapered sleeve (through which drop wire is run) and a wedge to which is attached a wire loop at the end for hooking over screw hooks, drive hooks, masonry hook anchors or porcelain knobs. When this wedge-type clamp is used for twisted pair wire it is necessary to untwist the wires and run them parallel through the clamp. Both the Kearney and the wedge-type clamp permit free swinging at dead-ends and place all wear on hardware rather than drop wire.

False Economy

In areas subject to sleet and wind storms it is false economy to radically reduce the factor of safety of drop wire strength in order to save a few pennies on the price of a drop because in the average case cost of a repair trip to splice together a broken drop is far more than any possible saving that could be made in the original cost of the wire.

Due to keen competition in all lines of business, underbidding and cut-throat practices have led to the offering of many low-priced products, some of which are of a mediocre or inferior quality. Good judgment must be exercised when considering extremely low-priced offerings as some purchasers have paid dearly for their supposed bargains.

There has been a quantity of "orphan" drop wire of questionable quality offered on the market. This has been sold at cut prices because wire of this type usually contains defects which from a standpoint of uniformity in quality make it impossible to be included in standard grades of wire.

Insulation Important

Some of this substandard wire is short lengths known technically as "mill ends." In some cases mill ends are all right but the general run of mill ends is a poor buy for the reason that the braid is usually not correctly saturated with the weatherproofing treatment and rubber compound may be insufficiently vulcanized, etc., due to the fact that the wire runs through insulating machines without proper tension being applied.

Evidence teaches us that poor insulating of a good conductor can make nothing but worthless drop wire. There is just as much difference between a good quality insulation and something resembling "mud" as there is between day and night. While careful buying is essential at all times, it does not pay to carry it to the extreme where purchases are made on a price basis alone and quality is relegated to a secondary consideration, because the buyer gets only what he pays for.

There is a characteristic of drop wire which is always a matter of speculation with the drop wire buyer unless he is buying a brand of wire which has given him satisfaction for a long time and on which he knows he can rely to the fullest extent. That is the question of aging properties of rubber insulation. Characteristics of the new insulation can be readily determined but how long will the rubber compound "stand up" under service conditions? Importance of this question can be grasped when it is pointed out that one set of laboratory tests of a number of different grades of insulation indicated a variation in life from three to twelve years!

Must Meet Tests

From the standpoint of standardization of manufacturing processes, it is a natural tendency to try to develop one rubber compound which might be used universally on all types of rubber-covered wire. However, due to peculiar and severe conditions under which drop wire is used, the ideal rubber compound for drop wire insulation must be especially designed to meet exacting service conditions encountered, and these conditions are far more rigorous than those which other rubber-covered wire, such as inside wire or bridle wire, must withstand.

In drop wire we have the condition of a thin wall of rubber surrounding a relatively small diameter conductor. As the wire is strung in the plant, it is under tension at all times. It is twisted through a sharp angle on knobs and, therefore, the rubber must be tough so that the conductor will not cut through. It must be able to withstand temperatures below zero Fahr. and as high as 135° Fahr. above zero without cracking or softening.

In addition, we have properties of oxidization due to sunlight to meet. Again, we have climatic changes from wet to dry, snow, sleet and wind to contend with. The rubber compound must be so designed that it will adjust itself to all these conditions and still have sufficient insulation resistance to prevent leakage of any appreciable amount of current.

Oxidization Problem

Rubber compound to meet these conditions must contain a high percentage of new rubber properly compounded with other ingredients that give it long life and contain latest chemicals known in the art to prevent oxidization. Compound should be applied by the tubing process without seams and so that it adheres to the conductor. The compound should be vulcanized so as to obtain the maximum properties of ingredients used and it should not act injuriously on the conductor.

The principal cause of rubber deteriorating with age is oxidization induced by exposure to heat, sunlight, cold and moisture. In order to design a rubber compound having long life, it is necessary to use ingredients which will retard oxidization. This is accomplished by use of so-called antioxidants. Obviously, progress along this line would be very slow if it were necessary to resort to natural aging to determine the proper value of various rubber compounds. Therefore, a method of producing accelerated aging is employed to properly evaluate compounds and determine the one most suitable.

The accepted laboratory method is Bierer and Davis oxygen bomb process of accelerated aging. By subjecting samples of rubber compounds to an atmospheric oxygen at a pressure of 300 pounds per square inch and at a temperature of 73° Cent. (163.4° Fahr.) for a period of 48 hours, accelerated aging equivalent to one year's natural aging may be accomplished. Ninety-six hours would be equivalent to two years and 144 hours to three years, etc.

Visual Inspection Not Enough

A visual inspection of drop wire simply made for appearance only will not

(*Please turn to page 32*)

Convention Schedule

Minnesota Telephone Association, Hotel Radisson, Minneapolis, January 23, 24 and 25.

Nebraska Telephone Association, Hotel Paxton, Omaha, February 13 and 14.

Iowa Independent Telephone Association, Hotel Fort Des Moines, Des Moines, February 21 and 22.

Oklahoma Utilities Association, Hotel Mayo, Tulsa, March 6 and 7.

Ohio Independent Telephone Association, Hotel Deshler-Wallick, Columbus, April 17 and 18.

RATING TRANSMISSION PERFORMANCE

By
W. H. MARTIN

From the January, 1931, issue of The Bell System Technical Journal.

(Continued from December)

IT SHOULD be recognized, however, that while the rate of repetitions required can be used for relative ratings of the transmission service performance of different circuits, such ratings in themselves do not give a complete picture of the service from the users' standpoint because they do not show directly the amount of effort required. Some idea of the effort exerted can be formed by the observers who are noting the repetitions but this cannot be quantitative. In addition to the repetition rate and effort there is undoubtedly another factor which affects the users' opinion of the service. In conversing over a circuit having a poor transmission performance, annoyance or irritation may be felt by the users because the amount of effort required may be considered by them to be unreasonable. These factors, by their smallness or largeness, may lead the users in the course of their conversations to make favorable or adverse comments regarding the circuit performance. These comments can be noted by the repetition observers and used, together with any notations on effort and annoyance, to supplement the repetition rating in arriving at a better picture of the service.

Ratings for Plant Design

To provide for the transmission design of the telephone plant along the lines of the previous discussion, ratings, termed "effective transmission" ratings, are being determined which are based on the repetition rate in normal conversations. Circuits of different transmission characteristics are considered to have the same effective transmission if their repetition rates are equal when they are used for the same kind of service. Furthermore, two changes in the transmission characteristics of a circuit are taken as equivalent on the same basis. The effects of such changes, however, are a function of the initial transmission characteristics and it is therefore desirable to take as a basis for rating such changes, a circuit which has characteristics typical in the various respects of the ranges encountered in practice.

As a standard reference circuit for determining an expressing effective transmission ratings, it is proposed to use a modification of the Master Reference System, inserting in this certain amounts of distortion, sidetone and noise to give it transmission characteristics comparable to those of present commercial circuits. Pending the development of this standard reference circuit, however, use will be made of a circuit consisting of station sets and instruments of kinds in general use, loops of typical length and construction connected by typical cord circuits to a trunk of specified transmission characteristics. For this latter it is convenient to assume a trunk having a cutoff typical of the loading systems in use and having a frequency characteristic which is flat below the cutoff point. It is also convenient to assume that the attenuation of this trunk can be varied uniformly for all frequencies below the cutoff point.

This circuit may also be assumed to deliver at the two ends a typical amount of line noise and to have typical room noise at the terminals. Such a circuit then specifies a complete combination of transmission characteristics which are typical of the telephone plant in commercial use and may be considered as a working reference circuit. The transmission service performance of such a circuit in commercial use can be changed by varying the attenuation of the trunk and this attenuation, expressed in decibels with respect to some reference value, can thus be taken as constituting a scale for expressing different grades of service performance.

Changes Can Be Made

Starting with such a circuit, changes can be made in its transmission characteristics such as varying the attenuation of the trunk and its cutoff, varying the length and type of the subscribers' loops, using different types of transmitters and receivers in order to get different efficiencies and kinds of distortion and changing the type of station circuit to get different amounts of sidetone. By using circuits of these various characteristics in commercial service and determining the repetition rates obtained, a relation can be established between grade of service and transmission characteristics both for different overall circuit combinations and also for the various changes which can be made in such a circuit. An outstanding advantage of selecting the type of circuit which has been indicated, as a working reference circuit, is that it readily permits direct comparisons of the service performance of the working reference circuit, or of circuits having closely similar characteristics, with the service performances of various types of commercial circuits.

It is desirable to go one step further and to express the effects of changes in various transmission characteristics all in terms of changes in some one characteristic of the circuit. For this latter has been chosen the attenuation of the trunk. In accordance with this, then, the effect of such things as differences or changes in cutoff of the trunk, line noise, room noise, transmitter and receiver volume efficiencies and distortions, sidetone, and, in fact, of any transmission characteristics of any part of the circuit can each be expressed in terms of an equivalent change in the attenuation of the trunk on the basis of equality of effect on service performance. Thus the ratings of all such effects can be placed on a basis which makes them readily comparable. For the practical range of variations in these factors it has been found that in general the effects so expressed can be added together with a good degree of approximation. Where this is not the case, interrelated sets

This installment concludes Mr. Martin's article on "Rating Transmission Performance" reprinted from the January, 1931, issue of *The Bell System Technical Journal*. The second article in this series on transmission basis for plant design will be "A System of Effective Transmission Data for Rating Telephone Circuits," by F. W. McKown and J. W. Emling of American Telephone and Telegraph company. It will be reprinted from the July, 1933, issue of *The Bell System Technical Journal*, and will begin in the February issue.

of effective transmission ratings can be supplied to cover the various typical combinations which are likely to be found in practice. This places the application of the ratings given by this method on a comparable basis with the application of the old volume ratings, that is, the assignment of a number to each part of the circuit, which numbers can be combined by algebraic summation in arriving at an overall rating for any particular circuit.

Rated As to Loss

In line with this, the effective transmission of a trunk, for example, is rated in terms of an attenuation loss of so many db plus a rating in db which expresses the effect of the range of frequencies transmitted with respect to some range selected as standard, plus another rating expressed also in db to take account of the noise on this trunk. Similarly, loop loss curves can be drawn up for the combination of instruments, set, loop and cord circuit such as has been used in the past on a volume basis. On the new basis, these curves will include not only the ratings of volume losses but also the ratings for the distortions in the loop and instruments and the effect of the sidetone on transmitting and receiving. In this manner, the transmission design of the plant can be carried out in about the same manner as it has been on the volume rating basis but the effects of distortion, noise and sidetone can all be included in these effective transmission ratings which are based directly on service performance.

This in outline is the method of determining effective transmission ratings which is now being worked to, its method of formulation and its application. The complete discussion and description of these matters involves innumerable details which, as already stated, it is not the purpose to set forth here. From this outline it is seen that this method provides the following outstanding things:

1. A scale for indicating different grades of effective transmission, which scale is expressed in decibels and is directly correlated with service performance by means of a typical circuit selected as a reference. This permits the specification of grades of service.

2. The use of this same scale as a means of assigning to each element of practical telephone circuits an index, expressed in decibels, which measures its contribution to the effective transmission of the circuit, these indices being of such a nature that those corresponding to the elements in a circuit can be combined in a simple way to give an overall performance index for that circuit. Such a system of indices is necessary for plant design.

3. A means of correlating effective transmission service and circuit transmission characteristics. This correlation is advantageous in setting up the indices of (2) and in development and design work in determining the desirability of possible changes in the performance of the various elements.

Two Advantages

The selection for the present of the typical practical circuit described above, as a working reference circuit, has two important advantages, which will be restated. First, by using a reference circuit having typical transmission characteristics, the indices established for changes in the various characteristics within the range of practical interest, are directly applicable to the present plant and can be combined in a simple manner to provide an overall circuit index. Second, and by no means of minor importance in the earlier stages of the application of the rating method here described, by using as a reference a practical circuit, it is possible and practical to make direct comparisons of the service performance of the reference circuit, or circuits having closely similar characteristics, with the performances of various commercial circuits.

The maintenance of the first advantage will require, however, changes in the working reference circuit as material improvements are made in the transmission characteristics of the commercial circuits. To obtain the second advantage means the use at present of carbon transmitters in the working reference circuit. These are open to the same objection here as they were in the Standard Cable Reference System, namely, the difficulty of exactly specifying their performance raises questions as to the reproducibility of their performance from time to time. This was one of the major reasons for the replacement of the Standard Cable Reference System as the basis for volume ratings by the Master Reference System for Telephone Transmission with its specifiable performance. To preserve the first advantage mentioned and at the same time to obtain a reference system whose reproducibility can be assured, it is the purpose, as more complete correlations are obtained between transmission characteristics and service performance, to associate with the Master Reference System, the means to make its transmission characteristics meet the requirements necessary to retain the first advantage. Meanwhile the Master Reference System will continue its function as a reference for volume ratings.

Determination of Ratings

To provide the basis for such a system of effective transmission ratings as has been outlined, several series of tests have been made, the most comprehensive of which has been under way for more than a year between several hundred stations in the American Telephone and Telegraph company headquarters building and a similar number of stations of the Bell Telephone Laboratories, between which there is a large amount of intercommunication. The connections between these stations are handled over special trunks in which the attenuation, cutoff frequency and line noise can be varied. At the stations, different types of instruments and station circuits have been employed. Observers are connected to each of these trunks who monitor the conversations over them and not the number of repetitions requested in each conversation and also the duration of the conversation. In this way is determined the repetition rate for a number of conversations between a number of different people for the various combi-

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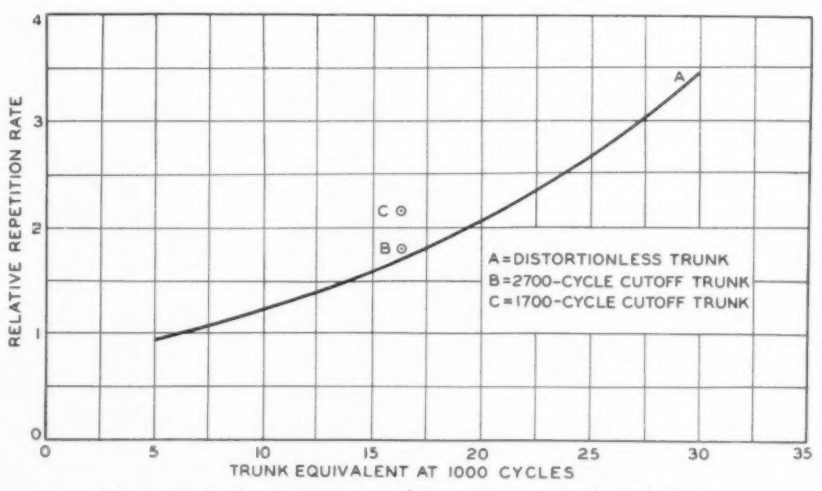


Fig. 1—Relation between repetition rate and trunk equivalent.

PAGING SYSTEMS--REVENUE PRODUCERS

By
R. C. RENO
Editor
Telephone Engineer

SERVICE is the chief commodity that a telephone company sells to its subscribers. Anything that makes this service better, faster, or more attractive always has an appeal to the engineering, commercial or operating divisions of a telephone operating company. When these factors are combined with increased revenue, the subject becomes of prime importance.

Results of this type are derived from up-to-date paging system installations. Code call systems have been used in conjunction with private branch telephone exchanges for years. These systems have been supplied by telephone companies on a rental basis or have been sold direct to the user. Now that the microphone, the amplifier, and the loud speaker combinations as applied by the *voice* paging system have been developed, the scope and field of this type of equipment have been greatly widened and the increased revenue is made immediately available to those who sell the service.

A typical paging system includes a microphone at the P. B. X. switchboard or elsewhere, amplifying equipment and loud speakers located throughout the institution in which the system is installed.

Before going into a description of how the paging system operates in a building, we first are going to give the potential prospects for this type of system, just to point out to telephone managers that they have a live market right within their own respective communities. Just a few of the practical uses of the voice paging systems are as follows:

In Manufacturing Plants — Persons may be called directly to the telephone, starting and closing signals may be given, fire alarm signals sent out, safety talks may be made without assembling the workers as they can listen at their benches or work locations, conferences can be called.

In Hospitals — Doctors may be paged, nurses may be located, visitors may be found. Addresses may be made by prominent people to all patients.

In Stores—Salesmen may be summoned to busy counters, particular sales may be announced to customers, lost and found articles may be reported, children located, and sales talks given to the store sales people.

In Public Garages—Cars may be ordered out, instructions for lubricating or cleaning may be given, and stolen cars may be reported.

In Hotels—Guests may be located, dining room service announced, bell boys summoned.

In Theaters—Directors may direct stage rehearsals from the floor of the theatre, actors may be paged in their dressing rooms, sound effects may be reinforced.

At Railway Stations—Train arrivals and departures may be announced, travelers may be located.

So, it can readily be seen that to start with, the telephone company has a good live market including industrial concerns, hotels, hospitals, schools, stores, recreational centers, governmental institutions, restaurants, public garages, etc.

You probably are asking yourselves just what direct telephone service improvement does such a system provide. This may readily be appreciated if you imagine a factory's P. B. X. operator's part in a telephone conversation which usually runs something like the following:

"Mr. Smith is somewhere in the factory but I am unable to locate him. If you will leave your number, I'll have him call you, or you can call back later."

An interesting story is told in these few words. The calling party has had a tedious wait, probably three to five minutes of wasted time. The operator's time has been consumed in trying various telephone points where she hopes to find the party called. The trunk connection has been held for an unproductive call. The telephone trunk is made busy so that one of the telephone entrances to the factory is closed to other calls and finally the whole incident is likely to be repeated when the calling party tries again.

Where a paging system is installed, the operator merely flicks a key, talks into a microphone and as quickly as speech itself, the message reaches the party desired over the loud speaker nearest to him, telling him that he is wanted on the telephone.

Paging systems have many things to recommend them to the prospective user, therefore, they create interest and desire almost immediately upon presentation. These systems are as fast as an operator's voice. They are efficient because a person responds to his name readily. A direct message can be given; for instance a conference can be arranged, instructions to a group may be given or a safety talk may be broadcast.

Paging systems are readily adapted to the growth of an institution the same as is a telephone system. More loud speakers and amplifiers can be added to fill growing requirements. They are flexible in that the speakers may be grouped, thus the factory workers may be paged first and the officers afterwards, or both simultaneously.

When amplifiers of high quality are used in paging systems it is always possible to build up the system so that additional features may be added. For instance, a phonograph may be connected to give dance music for the assembly hall of a factory, or a radio set may be installed to bring dinner music to a dining room or entertainment to any of the loud speakers in the system. Such additions would bring in more revenue to the telephone company and increase the value of the paging system to the user.

The above gives a few of the selling features of paging systems, which should convince telephone companies that these systems are salable. One of the main selling arguments is that these systems give great convenience and

(*Please turn to page* 25)

Third Article of a Series on Revenue Producing Products

PENETRATIONS OBTAINABLE IN PINE POLES

By
C. M. TILLEY
Superintendent
Texas Creosoting Company

IT IS rather staggering, sometimes, the lack of knowledge displayed by the users of treated material with regard to the penetration and distribution of the preservative in the material which he uses.

I once bet a man a car load of poles against the order for it that I could find untreated wood in one of his pole lines. He knew that he had poles that were treated one hundred per cent, he had even cut one off about three inches from the butt to make sure of it and wouldn't believe otherwise until we had bored the first pole about six feet from the butt; then he signed the order.

Then there was another one who swore by all the Gods of speech transmission that the penetration in his poles were so shallow that they were going to fail. That was seven or eight years ago and his poles haven't failed yet although I still think he is suspicious of them and expects them to go out on him at any minute. These poles had an unusually large heartwood content and for all practical purposes did not need a deep penetration to protect them from decay. They will probably be holding up his lines when he turns them over to his grandchildren to run for him.

Somewhere between these two extremes are the facts. It is unusual to find complete penetration except, sometimes, in very small poles and conversely, sometimes, a penetration which is comparatively shallow is not only adequate but all that it is practical to obtain.

Wood preservation is not as yet an exact science and the wood structure is infinitely complex. The wood is composed of millions of tiny cells of varying shapes and sizes, cemented together; each cell separated from its neighbor by walls of varying thickness and filled with saps and resins which are developed during the growth of the tree. The cells of the heartwood are very resistant to the passage of liquid and also resistant to decay while the sapwood is easily penetrated and much more susceptible to the attack of the wood destroyers.

The reason for this is that in the transition from heartwood to sapwood the cells die and become plugged with a froth like growth known as "tyloses," while the cell walls and in some cases the cell cavities, become infiltrated with various substances some of which darken the wood. This, naturally, makes the heartwood hard to penetrate and rot resisting to a high degree while the sapwood with its live cells and pores is more easily penetrated and more readily attacked by the wood destroying fungi.

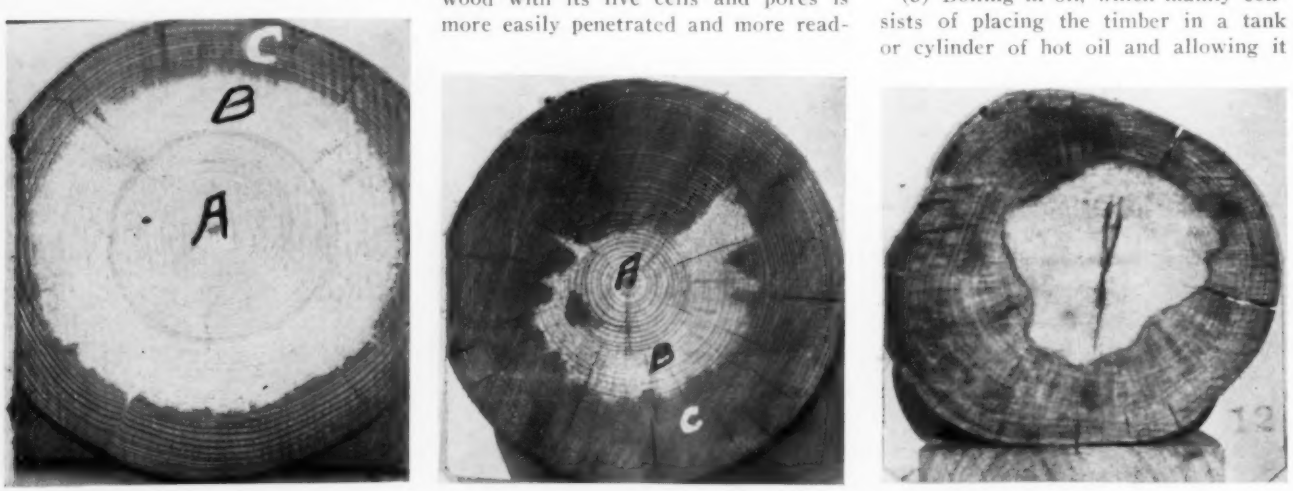
The proper seasoning of material before treatment has more bearing on the penetration obtainable than any other single factor. The seasoning is usually accomplished in one of three ways:

(1) Air seasoning, which is simply piling the material in locations which are free from infection, so there is a free circulation of air through the pile and around the individual units and allowing the material to stand until sufficiently seasoned for treatment.

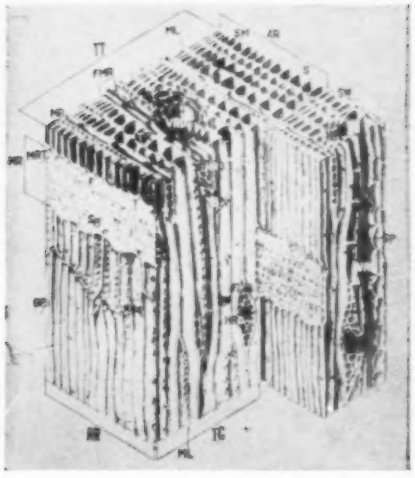
(2) Steam seasoning, which consists of taking the unseasoned material, putting it into the treating cylinder and giving it a steam bath by turning live steam into the cylinder and directly after the steaming; creating a vacuum to draw out the saps, resins and moisture which has been vaporized by the heat of the steam.

Poles properly piled for air seasoning. Note the absence of trash and weeds, the treated foundations well up off the ground and the treated strips between each layer of poles. This method of piling precludes untreated wood coming in contact with other untreated wood, and lessens the chance of infection starting at the point of contact.

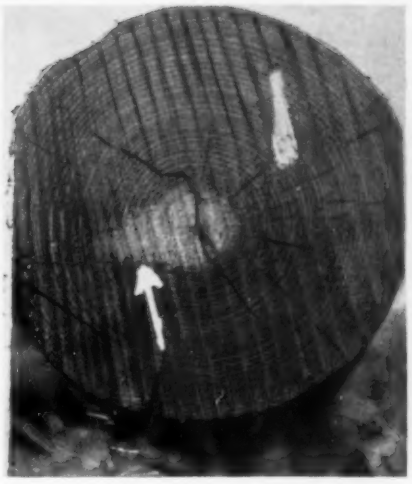
(3) Boiling in oil, which mainly consists of placing the timber in a tank or cylinder of hot oil and allowing it



Left: A good example of poor penetration from steam seasoning. Center: Poor air seasoning. These are typical examples of non-uniform penetrations but should not be confused with Number Three which is caused by uneven heart growth. In both "A" is heartwood, "B" is untreated sapwood and "C" is treated sapwood. Right shows no untreated sapwood.



Microscopic drawing of block of wood showing complex wood structure, cells, cell walls and ducts.



Left: Typical example of pitch pocket indicated by arrow. Note that there is slight darkening of this area caused by the penetration of the oil. Right: Knots, indicated by arrow, which have been very lightly penetrated.

to remain, either at atmospheric pressure or under a vacuum, until the required amount of creosote has been absorbed. This method is mostly used with the more refractory woods such as cedar or fir and is used very little on pine which is a comparatively easily penetrated wood.

It is readily obvious that the improper application of any of the seasoning methods will either cause damage to the timber involved or, where insufficient seasoning is given, will cause uneven and incomplete penetration in the sapwood which is the most readily penetrable portion of the timber.

Usually the heartwood gets little or no penetration when it is completely incased in sapwood. The oil may penetrate it for a sixteenth of an inch or a little more but observations lead us to believe that this is the limit of heartwood penetrations in timber that is wholly encased in sapwood unless high final retentions are used. Heart faces without the sapwood encasement can usually be penetrated for from one quarter to three quarters of an inch, but penetrations of this type are encountered only in sawn timbers as the heartwood in the usual pole is encased in sapwood except where it is cut off at the top and butt. The top and butt cuts are, however, taken care of very satisfactorily by the end penetrations. These end penetrations go in from the end of the stick and travel parallel to the axis of the pole and will extend for from three to fourteen inches in depth, depending a good deal on the character of the wood.

Example of excellent treatment in timber with medium amount of heartwood.

Knots and pitch pockets, as a rule, do not take oil readily but as both are filled with pitch and are the most resistant parts of the wood, even when untreated, the shallow penetrations secured are ample to protect them against the small chance there is for decay in these sections. It can be readily seen that where the cells of the wood are filled with resins, as in the case of pitch pockets and knots, it will be very difficult to get very much of the preservative into them; however, enough usually is injected into these areas to make them more toxic than are the original saps and resins.

Poles with an eight pound per cubic foot empty cell treatment should average around two to two and a half inches penetration. This average should be taken over a number of poles as the average minimum and maximum penetration will be approximately one inch and four and one half inches respectively, and in some cases more depending a good deal on the amount of sapwood in the stick, which directly controls the amount of penetration in each individual case. Long leaf timber having a large percentage of heartwood will, in all probability, run under the

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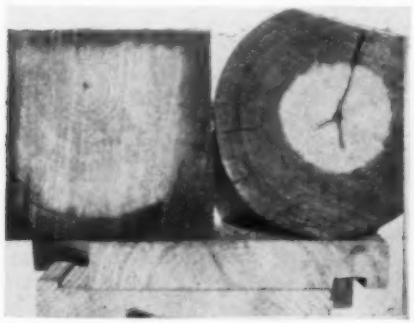
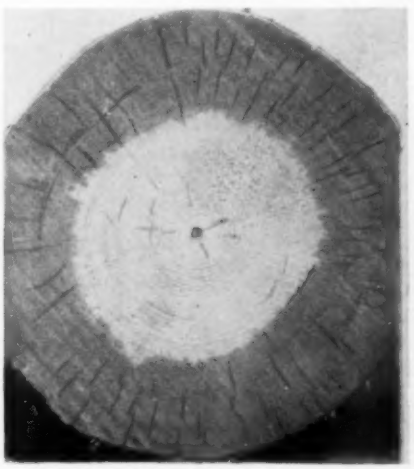


Sawn timber with two heart faces compared with round timber with heartwood encased in sapwood.



Example of well treated timber with more than average heartwood.

Sawn timbers. Left: Has two heart faces and very little sapwood. Right: Has heart face on only the upper left hand corner and a large percentage of sapwood.

WE BELIEVE SPENDING NOW SAVES US MONEY

Mr. Burton is an Operating Man Who Believes in the Policy Advocated by TELEPHONE ENGINEER for months: "Spend Now to Save." His Company, With 27 Exchanges, Has Spent $126,779.18 for Improvements in the Last Four Years. We congratulate Mr. Burton and His Company. His Story Should be of Interest to Every Operating Man.

Says
OSCAR BURTON
General Manager
Gulf States Telephone Co.,
Tyler, Texas

ALTHOUGH the economic sun has been in almost total eclipse for the past four years, and a return to normalcy is yet a long pull, and at each mile post along the come-back trail many obstacles will necessarily have to be overcome, it is felt that definite improvement is here.

During the period of eclipse, American business has been in the throes of an economic convulsion, not one single industry having escaped. Obviously, the telephone industry has been "taking it on the chin," yet it is evident that we have had special dispensation when we look around and compare our industry to others. Apparently there has been nothing that we could do about it except go along the best we know how, and conduct our business along sound and fundamental lines.

Many telephone companies, which had the funds to do so, took advantage of depressed prices of materials to improve the physical condition of their plants by doing the necessary construction work, and cleaning up weak spots so as to reduce maintenance cost to the minimum.

The Gulf States Telephone company has selfishly maintained an aggressive construction and maintenance program of work in Texas, having spent a total of $126,779.18 for improvements as follows:

Lands and Buildings	**$ 21,937.18**
New Central Office Equipment	**15,340.99**
Substation Corrective Work (Rewiring and replacing defective instruments)	**3,595.00**
Local Exchange Work	**20,893.65**
Toll Line Improvements	**65,012.36**
Total	**$126,779.18**

This improvement program was carried on throughout our system which means that each exchange is prepared to render the same efficient service that has always been rendered, and to take care of considerable growth without further expenditure for plant facilities except subscribers' station equipment.

During the period under review new buildings have been constructed at Arp, Groesbeck, and Overton. At Kaufman we acquired a building and lot suitable for housing the telephone exchange, and in June 1933 installed Common Battery equipment at the new location, retiring the old magneto switchboard and telephones. New central office equipment has been installed at Arp, Bremond, Groesbeck and Overton.

The substation corrective work was carried on at Bremond, Kosse, Overton, Groesbeck, Hamilton, Hico, Mabank and Kaufman.

Pole, wire and cable work, amounting to $20,893.65, was completed at Arp, Athens, Bremond, Gatesville, Groesbeck, Hamilton, Hico, Kaufman, Kemp, Kosse, Overton and Troup.

Realizing the necessity of maintaining our toll lines at a high standard of safety and transmission efficiency, new pole lines and copper circuits were constructed at an overall cost of $65,012.36 on the lines from Athens to Kerens; Athens to Ben Wheeler; Athens to Palestine; Athens to Dallas; Tyler to Athens; Tyler to Troup; Troup to Arp; Arp to Overton; Arp to Wright City and Carlisle; Overton to Norfolk and London; Hamilton to Carlton; Carlton to Hico; Hico to Stephenville; Stephenville to Lingleville and Gatesville to Arnett. This construction and reconstruction of toll lines also included rerouting existing lines through the city limits of Athens, Kemp and Mabank.

In making these improvements we thought it was good business to take advantage of the all-time low prices of some items of materials, particularly copper wire, and at the same time, "do our part" toward maintaining employment for a group of employees who had been in the service for several years, and who, otherwise, would have been thrown out of work. Moreover, it enabled us to keep a margin of man power as an element of safety against the assembling of an untrained crew, in case of catastrophe, which, thanks to Providence, did not overtake us.

It should be borne in mind that all of this work could have been postponed indefinitely, at the risk of service failures and ultimate greater cost in making the improvement. Now our plants are in excellent condition to efficiently take care of any increase in business that comes along.

"So-o-o!" (in the language of Ed Wynn) we are ready for the *big push*. And, unlike Ed, we are not going to "stick to our horse" in our effort to put some of these idle facilities to work in 1934.

BELL HAS 3RD MONTHLY STATION GAIN

The number of telephones in service in the far-flung American Telephone & Telegraph system showed another increase in November, the third successive month in which such a satisfactory result was achieved.

At the same time, traffic of the entire system for the month closely approximated that of November, 1932, indicating a substantial pickup in volume in the latter part of the month.

While the gain in net telephone connections for the system last month, amounting to between 5,000 and 6,000 units, was considerably smaller than in either of the two preceding months, it came as a pleasant surprise in view of the fact that the New York Telephone company, which operates about 20 per cent of the Bell system telephones, as well as other important American Telephone affiliates, reported decreases in active telephones for November.

Improvement in other parts of the country, however, particularly in the South, it is understood, counteracted the tendency toward curtailment elsewhere and permitted the moderate net gain for the system as a whole.

LINE and DESK

Ray Blain, A. I. E. E., Editor

Q.—Can the "U" type cable guards be bent like pipe to fit offsets on buildings when used to protect cable risers?

A.—These guards cannot be bent effectively but it is a simple matter to cut a "V" shaped notch in them with a hack saw and make a bend of any angle desired so as to make a neat and secure job.

Q.—What height above the floor should a wall telephone preferably be mounted?

A.—Wishes of subscribers should be observed and, if they have no preference, about 56 inches from the floor to the mouthpiece will generally be satisfactory.

Q.—Should house type cable terminals always be mounted vertical?

A.—This is not considered a necessity but generally preferable if space permits. They may be mounted horizontally, and many are, when space for vertical mounting cannot be easily obtained.

Q.—How should a common battery telephone be protected against the weather for outdoor use?

A.—It should be inclosed in a suitable weatherproof box with a door and a lock or latch to keep it closed tightly when not in use. However, the construction of such a box is both difficult and expensive and the purchase of an iron box telephone, sometimes called "Mine Phone" is recommended. All telephone manufacturers can now supply such an instrument for either manual or dial operation at a very reasonable cost and they will prove a worthwhile investment.

Q.—Is the use of duct shields recommended for use on all clay conduit installations?

A.—Duct shields are required only when necessary to prevent injury to lead cable sheath. They should not be required on clay conduit except where ends are rough or broken at manholes.

Q.—Can the position in which telephone bells are mounted affect their operation?

A.—Telephone bells are designed to operate in a horizontal position as in a wall type telephone. While they may give service if mounted vertically they should always be placed horizontally if at all possible.

Q.—Can the new drop wire clamps designed for use with parallel drop wire be satisfactorily used on twisted pair drop wire?

A.—They can providing the pair is untwisted for a short distance so that each conductor of the pair lie parallel and do not cross where they are gripped by the clamp. If the wires are crossed in the clamp a short circuit will soon result.

Q.—What type of trunk equipment should be used for lines between a local battery and common battery exchange?

A.—If universal cord circuits are not available repeating coil type trunk equipment should be provided. Even though universal cords are available on one position installation of repeating coil type trunks might prove desirable in order that trunks might be made available to all operators on the switchboard.

Q.—What marking is considered necessary in a cable terminal?

A.—Each pair should be numbered or the count of the terminal clearly indicated. The cable number and the pole or terminal number should also be indicated. Most manufacturers provide a space inside the terminal lid where the telephone number on each working pair may be indicated with a lead pencil. This record is desirable providing installers and troublemen will keep it up-to-date at all times.

Q.—In the rebuilding of a telephone plant should the use of 2 and 4-party line service be considered?

A.—When planning a rebuilding job every feature should be considered from all angles. Both 2 and 4-party line service is still extensively used by many companies and will probably continue for years to come. We consider it preferable to limit lines to 1-party selective ringing. Local conditions or rates might make the use of 4-party service highly desirable in particular cases. Modern equipment and construction methods have removed much of the trouble from party line service from an operating standpoint. In some localities subscribers demand main line or 2-party service while 4-party service may still be considered adequate in other exchange areas.

Q.—On house or block cable at what height about the ground level should terminals ordinarily be mounted?

A.—Unless some local condition makes it necessary to do otherwise they should be mounted low enough so that they may be reached by installers and troublemen without the use of a ladder.

Q.—Can it be considered a satisfactory practice to fan out paper insulated cables in house type terminals?

A.—Some companies follow this practice and claim their entire satisfaction even on small main frames. Fanning out paper insulated cable is however a difficult task and requires a careful workman. Everything considered the use of silk and cotton insulated cable on such work is recommended even though it is slightly more expensive.

Q.—When is the use of the "H" fixture recommended on pole lines?

A.—They are desirable on heavy lines at any point where great strength is required. Formerly storm guys were installed by guying one pole four different directions. This method did not prove entirely satisfactory and at the present time most companies install an "H" fixture and guy two directions or with the line. The "H" fixture has also been made use of to some extent on heavy curve corners. These fixtures are almost always used on each end of very long spans such as river crossings.

Q.—How should two wires be terminated on one binding post?

A.—Most binding posts are equipped with double nuts with two washers between them. Bare the wires and clean them thoroughly and wrap one around the terminal in the direction the nut will tighten always keeping the insulation back about ⅛ inch from the metal. Place first wire between bottom nut and washer and wrap second in the same manner between the two washers

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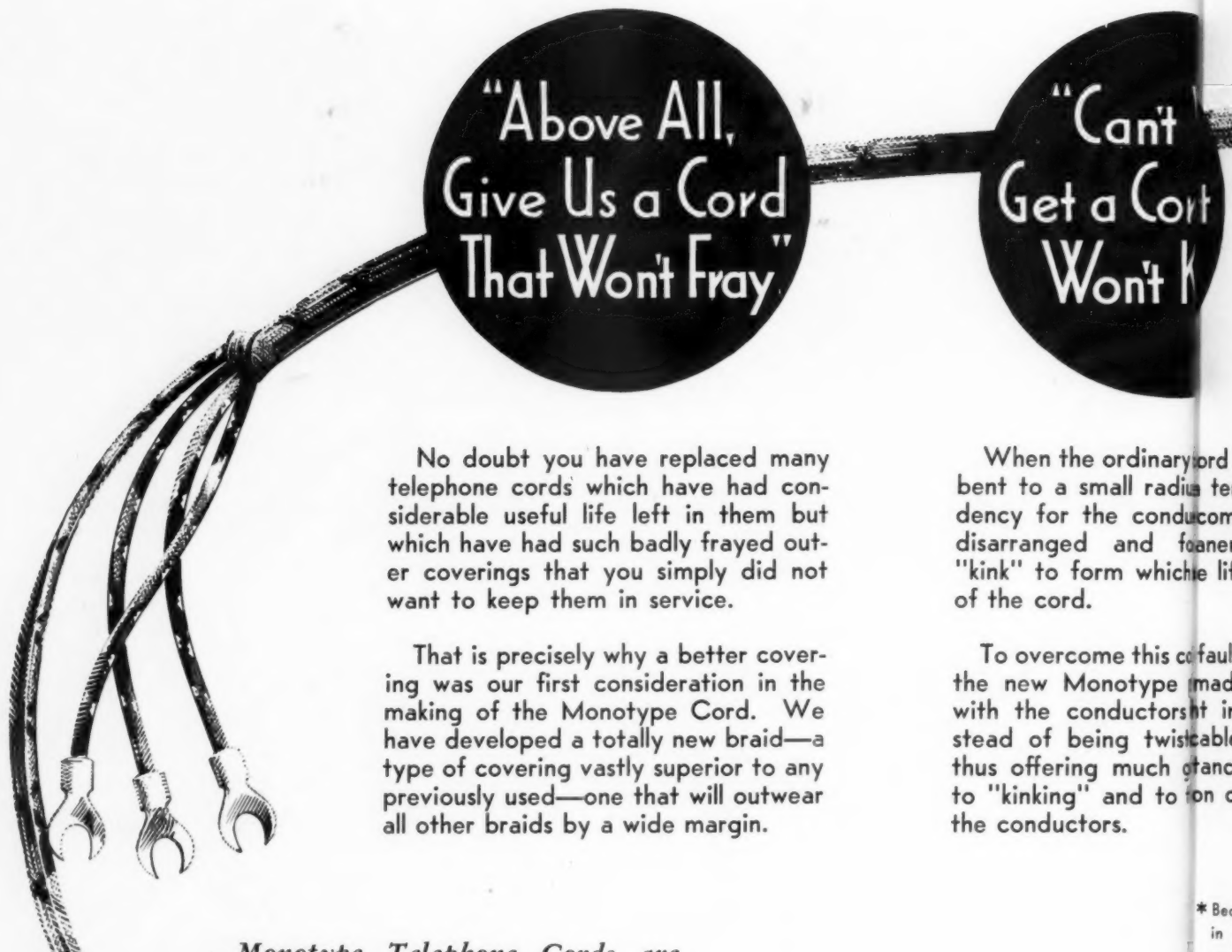
You — And 10,000 Othe Op
Designed This New LI



No doubt you have replaced many telephone cords which have had considerable useful life left in them but which have had such badly frayed outer coverings that you simply did not want to keep them in service.

That is precisely why a better covering was our first consideration in the making of the Monotype Cord. We have developed a totally new braid—a type of covering vastly superior to any previously used—one that will outwear all other braids by a wide margin.

When the ordinary ord is bent to a small radiu tendency for the conducome disarranged and foanent "kink" to form whichie life of the cord.

To overcome this cofault, the new Monotype made with the conductorsht instead of being twistcable, thus offering much otance to "kinking" and to ion of the conductors.

* Because in givin name "M Cord po long sou

Monotype Telephone Cords are available in all lengths — with any number of conductors—and trimmed as you want them.

American Anati

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TELEPHONE CORD*

"To Us, Good Insulation is All-Important"

"We Don't Want Noisy Cords at Any Price"

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The Monotype Cord has higher insulating qualities than any other cord of similar construction—both between the conductors of the cord and also between all conductors and external bodies.

This advantage is due to two factors —first, a special method of impregnation, and second, the tightly woven texture of the new, tough outer braid.

Neither accidental immersion nor humid climatic conditions can materially impair the usefulness of the Monotype Cord.

If you have ever had the unfortunate experience of purchasing cords which "looked good" but which became "noisy" after a few months of service, you will appreciate the economy of buying only the highest quality telephone cords.

The Monotype Cord has not been designed for a "price" market but to provide the highest quality cord possible. It is our sincere belief that the Monotype Cord is the most inexpensive cord you could buy today.

* Because this new product is so outstanding in all its qualities, we take pride in giving it — in company with other superlative telephone products — the name "Monotype." It is our sincere belief that you will find the Monotype Cord possesses all those characteristics which have always been wanted and long sought. Order a supply for trial — today.

Anatic Electric Sales Company

WEST VAN BUREN STREET, CHICAGO

ral Sales Agents in U. S. and Possessions for

COMICAGO . . . . . AMERICAN ELECTRIC COMPANY, CHICAGO

and other companies

Exclusive Export Distributors

LECTRICANY, LIMITED . . . . . 1033 West Van Buren Street, Chicago, U. S. A.

AUTOIC SALES COMPANY, S. A., 22, Rue de Verger, Antwerp, Belgium

AN ESSAY CONTEST BUILDS GOODWILL

By
J. C. BOUSH
General Manager
The Geneva (Ohio) Telephone Co.

ESSAY contests as a means to stimulate sales is nothing new to modern business, but the Geneva Telephone company recently conducted an essay contest that produced favorable results in building up its public relations and goodwill and in putting the company foremost in the thoughts of a goodly number of our subscribers and non-subscribers.

In November, we announced via advertising in our local newspapers our essay contest the subject of which was "The Meaning of Telephone Service for a Business Office and the Home."

The contest was open to all school pupils of 18 years and under, living within the operating limits of the Geneva Telephone company. They were invited to write an essay of 500 words or less on the usefulness of the telephone in the conduct of a business and what it means to home life.

As a lead we gave the following information in our advertisements:

"Stop to think how amazing it is when only 57 years ago since the first telephone conversation was held through a crude device and over an overland line extending from Boston, Mass., to Cambridge, a distance of two miles. And today the development of it has reached a pitch of perfection and with a network of wires makes possible a far-flung service that is almost world-wide.

"Day and night, all kinds of weather, 'Central' is ready to serve the telephone customer. All he has to do is to lift the receiver off the hook and she is ready to connect him with his next door neighbor, his doctor, lawyer or a business associate or friend across the sea. It is done so quickly and with so little trouble that few people stop to consider what goes on between the giving of the number or person wanted and the completion of the call. Now picture in your mind what it would mean if telephone service was shorn off from your community and had to rely on messengers or the mail to perform such work. It would present a sad picture indeed. Naturally chaotic conditions would follow. This is what we would like to have the school pupils harness their thought to and tell us what this swift courier of the spoken word stands for as they believe it to be."

The merits of the essays were passed upon by qualified judges and first prize was $10.00, second $5.00 and third $2.50.

The contest ended December 5, and by that time we had received many essays, the majority of which showed that considerable time and thought had been given to the preparation of the papers.

After the judges had selected the winners, their essays were published in our advertisement in the local newspapers.

Two column advertisements announcing the winners were directed to adults and we have found that they created considerable attention and interest. The two column ad announcing the first winner ran as follows.

"THE TELEPHONE MINDED

"Boys and Girls of High School Age and Under Expressing Their Opinion About the Incalculable Benefit of The Telephone In a Business Office and the Home.

"This is the outcome of a prize essay contest conducted by our company on "The meaning of telephone service for a business office and the home." Below is a reproduction of an essay submitted by Sylvia E. Abrams, Austin-rd, Geneva, aged 14, which was selected as winner of the first prize by the awarding judges who carefully examined the many replies of the entrants.

"Read this convincing message and see for yourself how this immeasurable service-value communication agency is looked upon by a young mind. It is a practical testimonial about the real value of a telephone. The answer is decisively in the affirmative."

The winning essay follows:

"Importance of Telephone Service for a Business Office and the Home

"We live in an age of marvels. One wonderful invention follows another, and no one can even guess the limits of the inventive power of man. We take many of these inventions as a matter of course, and seldom stop to think how different is the world in which our grandfathers grew up. The changes and improvements in methods of communication have been the greatest of all.

"Not very long ago at a public dinner in a New York hotel, a telephone instrument stood at every place. During the evening it was announced that a gentleman in San Francisco, known to them all, would speak to his friends. The diners took up the receivers, and, clearly and distinctly, heard not only the words but the very tones of their friend came to them across three thousand miles of mountains, valley and plain. This was considered very wonderful, but greater wonders have followed.

"The telephone has become so much a part of our daily life that we hardly realize how much we depend upon it until we try to think how difficult it would be to do without it. We call the doctor, the plumber, the grocer, or the butcher; the business man uses it dozens of times every day; we call our friends to talk with them over our telephones. Over the wires come good news, bad news, sighs, laughter, with all the tricks of speech by which we distinguish one voice from another. Can you imagine if we didn't have this Godsend what we would do? It would probably feel as if one of our hands or legs were missing.

"Every child should know who invented the telephone, as the modern world is indebted to him. That is the Honorable Alexander Graham Bell. When Mr. Bell and his assistant, Thomas A. Watson, carried on the first telephone conversation there were just two telephones in all the world.

"Now the Bell System connects more than 17,000,000 instruments. There are many reliable indepen-

(*Please turn to page* 34)

TELEPHONE SYSTEM PROTECTS BIG PLANT

By
E. A. REINKE
Commercial Sales Manager
Stromberg-Carlson Telephone Manufacturing Company

SO GREAT is the amount of capital invested in factories and equipment by manufacturing companies in the United States, that all large concerns have taken every possible step to protect their investments.

Today of all the varied departments in an industrial institution, the department having to do with protecting the company's property receives a great deal of attention from the management. One of the most important components of this department is the corps of watchmen. Upon these watchmen the responsibility of protecting their company's property from fire, theft, tampering, etc., is placed and it is their duty to keep the manufacturing plants in order during non-working hours.

Many unique watchman communication systems have been developed. Systems for two-way communication between watchman and headquarters and vice versa are the most popular.

The Eastman Kodak company of Rochester, N. Y., has one of the most efficient telephone watchman's systems in operation today at its Kodak Park factories, according to O. W. Bodler, electrical engineer, and A. H. Wingrave, wire chief at Kodak Park.

When considering the tremendous size of Kodak Park, it is apparent that the best system that can be had must be installed.

When Kodak Park was established by the late George Eastman, it included sixteen acres and today it has grown to over 400 acres. It has 120 buildings with 88 acres of floor space, making 3,833,280 square feet. Kodak Park is one of three large factories which the Eastman Kodak company operates in Rochester, in addition to the extensive main office building group.

The Kodak Park system was designed by engineers of the Stromberg-Carlson Telephone Manufacturing company, in conjunction with Kodak Park engineers.

The equipment consists of a special Stromberg-Carlson switchboard, which is wired for 100 lines with a drop and lamp per line and fifty-five standard Stromberg-Carlson Ironclad telephones, which are similar to phones used in mine telephone systems. The board is located in the main office of the Park. It has one cord and plug curcuit for ringing and talking only.

The fifty-five Ironclad telephones are located at the entrances and exits in the buildings and the grounds of the Park. The entrances and exits are patrolled by watchmen and the use of phones makes it possible for the foreman of the watchmen stationed at the switchboard to be kept posted as to the time the watchman passes these points and at the same time give the foreman a means of communication with the watchman.

Unlike most systems the watchman is not forced to make a verbal report from each telephone unless he has been called by the foreman or has a report to make, but instead he just removes the receiver from the hook and immediately hangs up. These calls are automatically recorded on a chart on the switchboard by a master clock, the description of which will be given in following paragraphs, and are marked down on a chart by the foreman in order that he may know at all time the locality of the watchman.

A drop is installed in each Ironclad telephone. If, while a watchman is travelling between two stations, the head watchman at the switchboard wishes to talk to him he will ring the next telephone at which the watchman will stop. When the telephone rings, the drop in the phone will release. As soon as the watchman reaches the phone, he unlocks and opens the door of the Ironclad telephone box and his attention is immediately attracted by the released drop which indicates to him that he has been called by the foreman. He then calls headquarters and places the drop in the phone box in its non-signalling position.

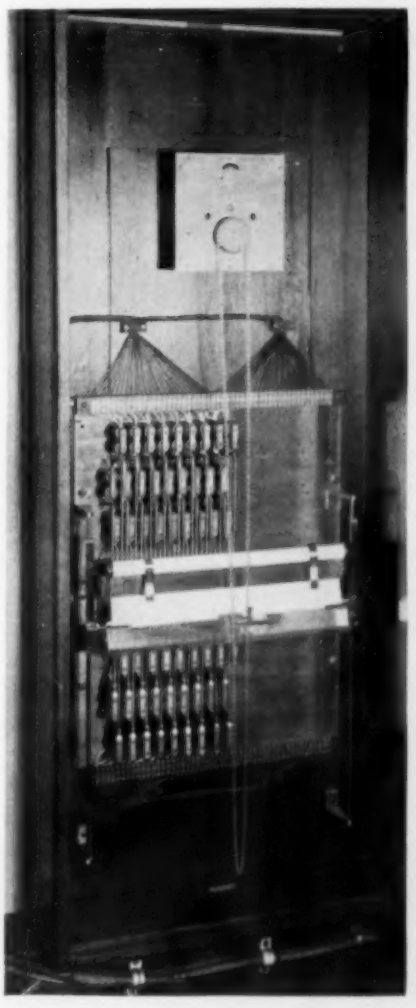
Another feature of the indicating drop is that the watchman is not forced to waste time by verbally reporting to the foreman at every station.

The Kodak Park system was designed so that two checks may be made on the work of the watchman.

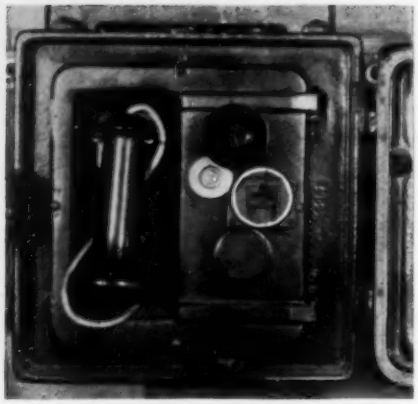
A Howard Recording clock, mentioned in a preceding paragraph, is installed on the rear of the switchboard in the main office and is arranged so that every time a receiver is removed from a hook of any Ironclad telephone, the time that the call is made and the number of the phone from which it originated is registered on a paper chart by the punch clock. In this manner, each call made by each watchman is recorded, thus giving the Supervisor an efficient method to check whether or not each watchman makes his regular calls and to check the foreman's record of calls.

The drops and lamps on the switchboard furnish the foreman with another check on the watchman.

If a watchman makes one of his ordinary calls; viz., if he removes the



The rear of the special Stromberg-Carlson switchboard at Kodak Park, showing the Howard Recording Clock, which records the time each watchman calls headquarters as well as the number of the station from which the call comes.



Stromberg-Carlson Ironclad telephones used at watchman's stations. Note signal drop in circle.

receiver from the hook and hangs up immediately, the drop on the switchboard connected to that line will release and the lamp will flash, indicating to the foreman that the watchman has called on that station. The foreman registers the call on a chart and manually places the drop to its non-signalling position.

The head watchman keeps a time record of all the calls made by all the watchmen and also the numbers of the stations from which they originated. This system also furnishes a check on the watchman while he is making his round. For instance, if the watchman has checked in from Station No. 6 at 10:30 P.M. and he is next due at Station No. 7 at 10:40 P. M., but if he does not call in at 10:40, the operator knows that he has been delayed and will be alert to offer any assistance, should any trouble develop.

According to the engineers of the Eastman company the system has been very satisfactory and they highly praise the efficiency of the entire equipment. The Factory Mutual Insurance company and the Standard Insurance company have approved the system and believe it to be one of the finest that has ever been proposed.

In addition to this elaborate telephone watchman's system, Kodak Park has an outstanding private branch telephone exchange.

The switchboard is an 8-position Stromberg-Carlson Super-Service system arranged for four-party harmonic machine ringing and is equipped with 1,000 lines serving 1,122 stations. This is the size of an exchange serving the average city of 10,000 inhabitants. Two of these positions are incoming trunk positions, handling all incoming city calls connected directly with the Rochester (New York) Telephone corporation exchanges and calls from the Main Office over tie lines. Mr. Wingrave states that an average of 300 calls per hour per operator are handled by operators on five of the six local Super-Service positions during the period from 8:00 A. M. to 5:00 P. M. not including noon hour. This is an exceptionally good performance for this type of telephone traffic.

RAMBLINGS

By J. A. S.

This here ramblings job has its compensation as well as its drawbacks. 'Firinstance, a week in the nation's capital is not to be regarded lightly by any one. And—especially when that week happens to be the Christmas season and the whole nation is bubbling over with goodwill and Washington trying to set an example for gaiety. The midnight oil—or "modernistically" speaking, midnight electric lights—have shown in the windows of Rambler more than once during this week of weeks among the elite.

* * *

A fellow never had too many friends, and that it is good policy to do all we can to make and retain friends, has been demonstrated right here at the hub of the business world. Friends made in the early days of our personal history, when Washington was no more than myth to us, have sponsored visits and trips that were the envy of those who were not so fortunate. A brand new resolution is on our calendar from now on, and that is to treat every fellow as if he is your boss (he may be sometime).

* * *

After spending a dozen days around home during Thanksgiving, Rambler took his family and trekked over the snow east, visiting old friends here and there. In South Bend, Indiana, we naturally stopped to pay our respects to W. F. Qualls, ex-sales manager de luxe of the Monarch Telephone Manufacturing company, also extinct—now part of the American Automatic Electric Sales company. Qualls, as you will remember if you kept up with Rambler, is connected with the city of South Bend in its fire and police alarm department. He is at present erecting a police radio station for that berg. As he is out of the telephone business we could learn little from him of interest to the industry.

* * *

Next we called on the Do-More Chair company of Elkhart. Friend Williams, who directs the destiny of that concern, informed us that business was very satisfactory with his company; that orders from different parts of the country, both Independent and Bell, indicated a revival of business this year. In mentioning a certain large newspaper for criticising the government's programs, Williams stated that it was hard to convince a firm who was receiving orders that the NRA and other moves were bad. This firm looks for a good business during 1934.

* * *

At the offices of the Northern Ohio Telephone company at Bellevue, Ohio, we found Messrs. Knapp and Henry out of that little city attending company business in other towns in which they are interested. We were informed that a sales campaign during last fall netted this concern more than 500 new subscribers for their system. "Pretty good, we calls it."

* * *

An exchange we like to visit is that of the Elyria Telephone company in the thriving little city of Ohio near Cleveland, presided over by that sterling pair, Curran and Dutter. Here we always find a welcome and plenty of good sound advice, a review of conditions in that section of the state, information that helps us to draw conclusions about the balance of that great commonwealth. Here it was the old, old story of installations increasing slowly, but surely, and a prediction that a long pull would place us again in a commanding position as an industry.

* * *

We've tried to remember our friends with New Year cards but away from our files we are afraid we failed to remember all addresses. The following lines express our predicament:

We wish you
New Year's
Joys, we do—
And wonder what's
Become of you.

STATION GAIN

A letter has been received from Wayne J. Berry, manager of the Western Telephone corporation's exchange at Ashland, Kans., telling that during December, 1933, that exchange showed a gain of twenty stations.

TELEPHONE MORTGAGE LOAN COMPANY FORMED

THE Union Mortgage Loan company, an organization to secure financial assistance from the Reconstruction Finance corporation to enable Independent telephone companies, with satisfactory assets and earnings, to proceed immediately with improvements to their plants and equipment has been organized, according to an announcement to telephone operating companies, by J. W. Perry, president of the company.

Offices of the Union Mortgage company are maintained at 1309 Commerce Building, Kansas City, and in the office of the United States Independent Telephone association, 19 South LaSalle Street, Chicago, and its activities will be directed by Mr. Perry, formerly president of the Commercial Trust company of Kansas City and recently connected with Theodore Gary and company.

According to the announcement, the company was "organized to serve the Independent telephone industry as a group." Its facilities are open to all Independent telephone operating companies; also to all manufacturers of telephone equipment and suppliers of material for use by Independent telephone companies."

The company will endeavor to secure loans for the following purposes:

1. **The purchase of equipment and supplies needed for central office as well as for outside plant.**
2. **To make needed improvements in present buildings.**
3. **Financing the erection of new buildings.**

It also will consider making loans where a part of the funds will be used to pay existing indebtedness, but the primary purpose of the company will be to make such loans as will immediately increase employment, it is stated.

Loans which can be liquidated within six months will be made at five per cent interest from date and loans for three years will draw six per cent from date, payable semi-annually. These loans may be paid at any time, according to the company.

The company charges no commission on any loan made from funds obtained through the Reconstruction Finance Corporation, it is said. The interest rates quoted above include a spread for the purpose of maintaining the Union Mortgage Loan company, and provide some return on its capital.

In a letter issued by the United States Independent Telephone association, it is pointed out that under the R. F. C. rules, the loan company must carry one-fifth of the R. F. C. loan and one of the problems encountered was the securing of the necessary capital to do this. According to the letter, several manufacturers have agreed to supply the necessary capital for the Mortgage Loan company.

All Independent operating companies interested are invited to send a letter indicating the purpose and probable extent of their requirements, together with a copy of their recent financial statements to the company's Kansas City office or to the United States Independent Telephone association.

GREATER USE OF SERVICE STIMULATED

A campaign purposing to secure a wider use of telephones has been conducted by the Boyer Valley Telephone corp., of Logan, Ia. From the period beginning on December 1 until Christmas day telephones were installed without the usual installation charge, which means a considerable saving for the patron.

Employees of the telephone company joined in a contest to see which one could enlist the largest number of subscribers under the new plan, and awards were made to the winners. Efforts were made to prove to those who, because of economic reasons were not using telephones, that the cost of telephone service is so small that its convenience much more than offsets the expense. The well recognized need for a telephone in every home and in every place of business was stressed in the campaign for a much greater use of telephones.

CONSTRUCT CABLE

Construction of 27½ miles of stormproof aerial telephone cable between Reading and Lancaster, Pa., to be connected to the Bell system's cable which passes through Reading and extends approximately half-way across the country, has been started by the Bell Telephone company of Pennsylvania, it was announced. The job will require several months for completion and will cost approximately $165,000, according to W. F. Bush, district manager.

PAGING SYSTEMS ARE REVENUE PRODUCERS

(*Continued from page* 15)

saving in time and money to the user.

In some instances the selling or renting of paging systems would not require much effort on the part of the telephone company, but of course, other cases might require salesmanship which means that a proper presentation of the product must be made. However, one thing seems certain, and that is a determined effort to merchandise this product is certain to produce some sorely needed telephone revenue.

Here again it might be well to point out that paging systems are being sold every day by electrical contractors and radio men and we believe telephone companies should be receiving some of the revenue derived from the sales of this popular communication product.

Write TELEPHONE ENGINEER for further information.

PENETRATIONS IN PINE POLES

(*Continued from page* 17)

average given above; while on the other hand, short leaf timber having a large percentage of sapwood will run considerably over this figure.

Irregular heartwood growths will sometimes be confusing as they will show either deeper or shallower penetrations than are actually the case if the borings are not taken from a spot which happens to represent the average of the stick. These, however, are not of very frequent occurrence and if a number of poles are sampled will not make a material difference in the averages obtained.

All of these factors must have consideration when judging the efficacy of penetrations and with them the additional fact that the complete and uniform distribution of the preservative through the sapwood is probably the biggest single factor in efficient wood preservation.

ANNUAL CONVENTION

The executive board of the Oklahoma Utilities Association has announced that the 16th annual convention of the Association will be held March 6-7, 1934 at The Mayo Hotel, Tulsa. A big attendance is expected at the convention.

WOOD PRESERVERS MEET

The thirtieth annual convention of the American Wood-Preservers' Association will be held at the Rice Hotel, in Houston, Texas, on January 23 to 25, 1934.

L. M. BERRY & COMPANY HOLDS ADVERTISING SCHOOLS

L. B. BERRY & company held training schools for their directory advertising salesmen in Philadelphia, December 27-30, and in Dayton, January 3-6. Later schools will be held in other sections of this company's large territory covering 20 states.

The purpose of the training schools was to more intensively instruct directory advertising salesmen in the best methods of meeting the problems of present day selling, as well as how to sell directory representation in a more efficient and systematic manner, and in accordance with the principles and policies of telephone companies.

This involves selling the telephone subscriber the type and amount of directory representation most suitable for his business requirements, arranged to secure for him the greatest possible benefits. It also involves the continuous rendering of service in a manner which tends to create and increase goodwill and satisfaction on the part of telephone subscribers and advertisers.

The subjects taught and discussed during the training course were as follows:

1. **The Telephone Directory.**

   Historical background of telephone directories. Content and purpose of each part of directory. Directory services for sale. Directory mechanics and structure.

2. **General Advertising.**

   Purpose, types and functions of advertising. Advertising media, advertising agencies and campaigns.

3. **Telephone Service Rate Structure and Directory advertising rates.**

   Principles and objections in establishing rates for telephone services and for directory advertising representation.

4. **Classified Heading Structure.**

   Purpose, selection, arrangement and indexing of headings. Types of headings. Heading restrictions.

5. **Classified copy preparation and layout.**

   Effect of copy layout on the appearance of classified pages. Description of copy considerations, typographical considerations, art work and illustrations, and border and decorative material.

6. **Some aspects of General Business Operations.**

7. **Sales Procedure.**

   1st Step—Description of the selling process. Preparation. Elements of the sales interview. 2nd Step—Approach to Prospect. 3rd Step—Presentation. 4th Step—The close.

Sales demonstrations of a highly intensive nature, including some phases of each subject taught, were planned and each salesman was requested to participate.

Salesmen and other members of the L. M. Berry & company telephone directory advertising sales organization from Ohio, Indiana, Kentucky, Tennessee and Virginia, who attended training school held in Dayton, Ohio, January 3-6. Left to right: Front Row—H. C. Hull, L. V. Stinson, C. A. Kraege, J. H. Atchison, L. M. Berry, J. W. Stafford, visitor, W. A. Steuer, I. J. Klass, E. C. Hunt.

Second row—W. H. Davis, J. H. Wehmhoff, H. Ferguson, J. B. Schultz, J. P. Holston, W. H. Hosea, C. A. Kimmel, C. J. Ferree, C. H. Gravett, E. A. Clark, C. F. Wertz.

Third row—F. Moseley, O. E. Wilkins, A. B. Blankenship, F. A. Babbitt, M. Hyman, A. P. Barker, E. Howard, J. A. Shearer, H. F. Scott, E. R. Langston.

Fourth row—H. K. Urban, J. W. Wilson, A. L. Snodgrass, E. C. Longstreth, R. I. Mummert, F. Hawker, D. L. Miller, W. H. Garrett, W. L. Crouch, R. S. Dodds, W. G. Christie.

ATCHISON WITH BERRY, DIRECTS SCHOOLS

Early this month L. M. Berry of the L. M. Berry and company, Dayton, directory publishing firm, announced that J. H. Atchison has been appointed assistant sales manager. In this position he has direct charge of advertising sales methods and salesmen training schools.

Mr. Atchison has been admirably prepared for a position of this kind through his entire period of telephone directory experience. Originally he spent several years with the Southern Methodist Publishing House of Nashville, one of the largest printing companies in the South. His duties there fitted him for telephone directory compilation and publishing. His first telephone directory position was with the Cumberland Telephone and Telegraph company as advertising manager and directory supervisor. An interesting side light on his duties at this time is the fact that he was editor of the Cumberland Journal which was the first employee publication in the Bell Telephone System.

He was later transferred to Atlanta, with the Southern Bell Telephone company as special agent. Here he was in charge of all directory advertising activities and also became assistant editor of the Southern Telephone News.

The success of his directory work in the South led to his transfer to the Bell Telephone company of Pennsylvania in 1917. There he occupied the position of general directory advertising sales manager. In succession he was promoted to the office of directory manager and was transferred to the general directory staff as "Methods Supervisor." In 1924 the American Telephone and Telegraph company secured his transfer to their New York office so that his experience and knowledge could be placed at the service of all the associated companies in the Bell group. Until his retirement in 1932 he was manager of the directory advertising methods department and was also directory rate engineer.

With Mr. Atchison's appointment with the L. M. Berry and company, this firm has secured a valuable addition to its already efficient sales organization.

Something to Think About

By R. C. RENO

ONE beneficial result (if there is such a thing) of the depression in the telephone industry has been the wide adoption of telephone sales campaigns by an increasing number of Independent companies.

Many operating units in our industry have learned that to get their share of the dollars being spent they must get out and SELL their product—telephone service. They have realized that the day of counter order taking is a thing of the past and they are today giving their local merchants the "fight of their lives" in getting the money being spent in their communities.

And—the companies conducting these campaigns report that they stimulate new business and public relations. This is something for managers who have not tried any campaigns to think about.

It is gratifying to us to see more and more companies active along these lines because TELEPHONE ENGINEER has consistently urged telephone men to "fight fire with fire" and go out after business by using modern sales and advertising methods. We feel our work has not been in vain.

* * *

Down in Virginia we note that the grocers through Tidewater Retail Grocers' Association are seeking reduction in telephone rates. It seems to us that the grocers should be the last to fight the telephone company and its rates. A great percentage of their business comes via the telephone and if anyone receives value paid for, it's the grocers.

* * *

Another trend which we also are glad to see in the industry is that of more construction work. Lately there seems to be more Independent companies making necessary improvements in their properties or are at least buying materials for future work. TELEPHONE ENGINEER has urged telephone companies to make improvements while prices are comparatively low. Again we feel our effort has not been wasted.

* * *

Along the buying line we absolutely are in favor of telephone engineers recommending nothing but good, quality products to their managers. Much money has been lost in the past few years in the use of "cheap" and inadequate products. "Back to Quality" should be the 1934 slogan.

* * *

Apparently more telephone men are recognizing the value of telephone trade publications. New subscriptions were slow in coming during the first half of 1932, but like telephone stations they are beginning to come in again.

Telephone executives and workers need their trade journals and every effort should be made by the operating companies to help supply them. They are valuable in conducting telephone business.

Just something to think about.

LINE & DESK: QUESTIONS AND ANSWERS

(*Continued from page* 19)

and tighten the nut.

Q.—What is the difference in the pair and conductor method of numbering on a cable system?

A.—Conductor numbering is a method whereby each conductor is given a number. Pair 1 becomes conductor number 1 and 2 and pair 2 conductor numbers 3 and 4 and so on. This was the old time method and is still practiced by some companies as they claim it facilitates testing and the use of split pairs in case of trouble. Personally we prefer to give each pair of two wires one number as we believe it makes the records clearer.

Q.—When the cable "U" guard is used on a pole or building to protect a cable should the end of the cast iron pipe bend be sealed?

A.—As the "U" guard does not exclude water the end of the pipe bend should be sealed to keep water out of the underground conduit. This can best be accomplished by driving oakum into the pipe around the cable and down about two inches from the top. The pipe end can then be filled level with cement consisting of equal parts sand and plaster of paris or a suitable compound.

Q.—Is the use of prepared cotton sleeves for insulating the conductors in a cable splice considered satisfactory?

A.—They have been found entirely satisfactory in every way and in general much better and easier to use than sleeves boiled-out and punched or formed on the job. The sleeves prepared in the factory are all uniform and a splicer can generally make much better time when using them and the helper can devote his time to some work more useful than punching sleeves.

Q.—When a splice is made in a buried tape armored cable is it necessary to connect each end of the steel tape armor across the splice?

A.—The electrical continuity of the steel tape should be continued across the splice for electrolysis reasons. When a tap armored cable is spliced to a regular underground cable in a manhole the ends of the steel tape armor should be connected to the lead sheath of the splice.

Q.—When splicing a paper insulated cable inside a dry warm building is it considered necessary to boil-out with paraffin?

A.—To take no chance of low insulation resistance all paper insulated cables should be boiled-out thoroughly when spliced. However, if a splice is being made inside a dry office building where injury might be caused to property or persons the use of hot paraffin might well be omitted. Also in some small house terminal boxes the use of hot paraffin is almost impossible.

Q.—Why do relay windings differ in method of construction?

A.—All relays cannot consist of a simple single wound magnet due to the fact that they must be used in various types of circuits of varying characteristics. Sometimes it is necessary to use a relay in series with a talking circuit and the inductance of its winding would act as a choke to currents of voice frequency and it is necessary to by-pass them around the relay. This could be accomplished by shunting the winding with a condenser of suitable capacity but a more effective, and, at the same time more economical way, is to wind the relay with three wires, two of which form a non-inductive shunt, and the third the magnetic winding. In the retardation type cord circuit it is common practice to combine the retard coil and supervisory relay by constructing the relay with a double winding of two sections, one of which is in each side of the cord circuit. Various other special relay windings are used to meet special conditions in telephone circuits.

ADS ON ENVELOPES

The Geneva (Ohio) Telephone company uses its envelopes to advertise the value of telephone service. On the back of its envelope is printed the word:

BUYING
TELEPHONE SERVICE
IS AN INVESTMENT
AND
CONVENIENCE

NEWS OF FOREIGN COUNTRIES

SYSTEM EXTENDED

On October 10, 1933, the new telephone line between Balikesir and Ankara, Turkey, was opened to the public. This line will shortly be extended to connect the city of Izmir and upon completion of the latter line long distance telephone service will be available between Ankara and Izmir and between Izmir and Istanbul. A telephone line has recently been installed between Istanbul and Kereke and will shortly be opened to public service.

TIENTSIN TO TSINAN

Long distance telephone communication between Tientsin and Tsinan, provincial capital of Shantung, was inaugurated on October 10, following the completion of arrangements between the Provincial Departments of Reconstruction for Hopei and Shantung.

AUTOMATIC TO BE INSTALLED

The Government is expected to place a contract of the value of £170,000 with a British concern for the equipment of two automatic telephone exchanges at Kovno and Memel.

DENMARK STATISTICS

The length of line of the Danish telephone system as of January 1, 1933, totalled 1,748,573 kilometers compared with 1,633,395 kilometers in 1932. Air lines make up 366,644 kilometers of the total and cables 1,381, 929. The comparative figures in 1931 were 379,235 kilometers and 1,254,160 kilometers respectively.

Subscribers totalled 297,235 at the beginning of 1933, against 301,756 the year before. Apparatus in use numbered 353,157 compared with 356,932 a year ago. The number of exchanges dropped from 1825 on January 1, 1932 to 1814 on the corresponding date of 1933. Of these 114 are town exchanges with day and night service.

The aggregate income of the Danish telephone system in the working year 1932 amounted to Kr. 48,637,921 (par value of krona $0.268) as opposed to Kr. 49,762,582 the previous year. New installations in 1932 involved an outlay of Kr. 13,146,023 compared with Kr. 19,408,578 in 1931.

Conversations totalled 545,142,608 in 1932 compared with 558,323,199 in 1931. Of the 1932 calls, 78,161,146 were long distance calls and 466,981,462 were local calls. The income per call amounted to 9 ore, the same as the previous year, while the cost was 2.2 ore, also the same. As of January 1, 1932, there were 10 telephones per hundred inhabitants in Denmark.

HONOLULU MUTUAL REPORT

According to the 1932 report of the Mutual Telephone Company of Honolulu, Hawaii, which operates a telephone system on and between the islands of Kauai, Oahu, Molokai, Maui and Hawaii, there was a loss of 1,593 telephones for the year. The company stated that 1932 was the first year since the inception of the automatic system 22 years ago that the number of stations operated was less than the previous year. In regard to the company's inter-island radio-telephone system during the first year's full operation, a total of 15,328 paid calls were handled, of which 60 per cent were business and 40 per cent social. Concerning the transpacific radio-telephone system, the company handled a total of 1,170 calls during the year between Hawaii and the United States, Canada and Europe. Net income for 1932 amounted to $283,998, and $60,854 was transferred to surplus.

INSTALLATION IN BATA FIRM

The Bata shoe firm has contracted for the installation of a new telephone central which will replace the antiquated system now in use. The new system will be completely automatic and will have 1,000 telephones which will be used in the various departments and buildings. The system can be used for inter-factory, local and long distance calls. It will be operated by storage batteries of 60 volts.

REDUCTION IN AUSTRIA FEES

By a decree of September 25, 1933, certain changes have been made in the charges made by the Austrian Telephone Administration for the Telephone installations and transfers. No charge will be made in future for normal installations, i. e., new subscribers will not be required to pay installation costs. Also, in cases where telephones are assigned by one subscriber to another the fee hitherto charged for such transfers will be eliminated. When a telephone subscription of a higher category is changed to one of a lower category, the fee for such change has been reduced from 100 to 60 Schillings. When subscribers change their domicile only the actual cost of moving the telephone will be charged. Installation charges will only be assessed if subscribers live in remote sections involving unusual expense. For installations made prior to June 30, 1934, dues will be collected monthly instead of at the longer periods now in force. The above changes will cost the Austrian Telephone Administration approximately 1,000,000 schillings, but it is hoped that this loss in revenue will be fully offset by revenue from an increased number of telephone subscribers.

AGREEMENT ON SINAI LINES

Protracted negotiations have been going on since 1926 over the use and rentals for the wartime built telegraph and telephone lines, owned by the Palestine authorities, but connecting Raffa and Kantara on the Suez Canal. The principal points of the agreement now reached are as follows: (1) The Egyptian Government agrees to pay an annual sum of L.E.881 (par value Egyptian Pound $4.94), (2) The sum due to each of the governments from the use of the line passing by E. Kanatara and Rafah has been modified from May 1, 1933, (3) In addition to the annual rent and the dues on the telephone communications payable to the Palestine government, the Egyptian government will pay a round sum of L.E.1,000, (4) The arrangements apply to the six lines at present in use and (5) The annual rental must be paid on May 1 of each year. This agreement runs for five years, dating May 1, 1933, and can be cancelled upon a written one month's notice by either party.

SERVICE WITH RHODESIAS

The final stages in the linking up of the Union of South Africa's telephone system with that of Southern and Northern Rhodesia are now being completed, and it is expected that service will open in September. The new service will provide communication from a large number of places in South Africa, including all the principal urban centers, to various points in Southern and Northern Rhodesia. A call from Cape Town to Ndola will be made over 2,350 miles of telephone routes. It is expected that a call from Johannesburg to Bulawayo will cost about 9 shillings.

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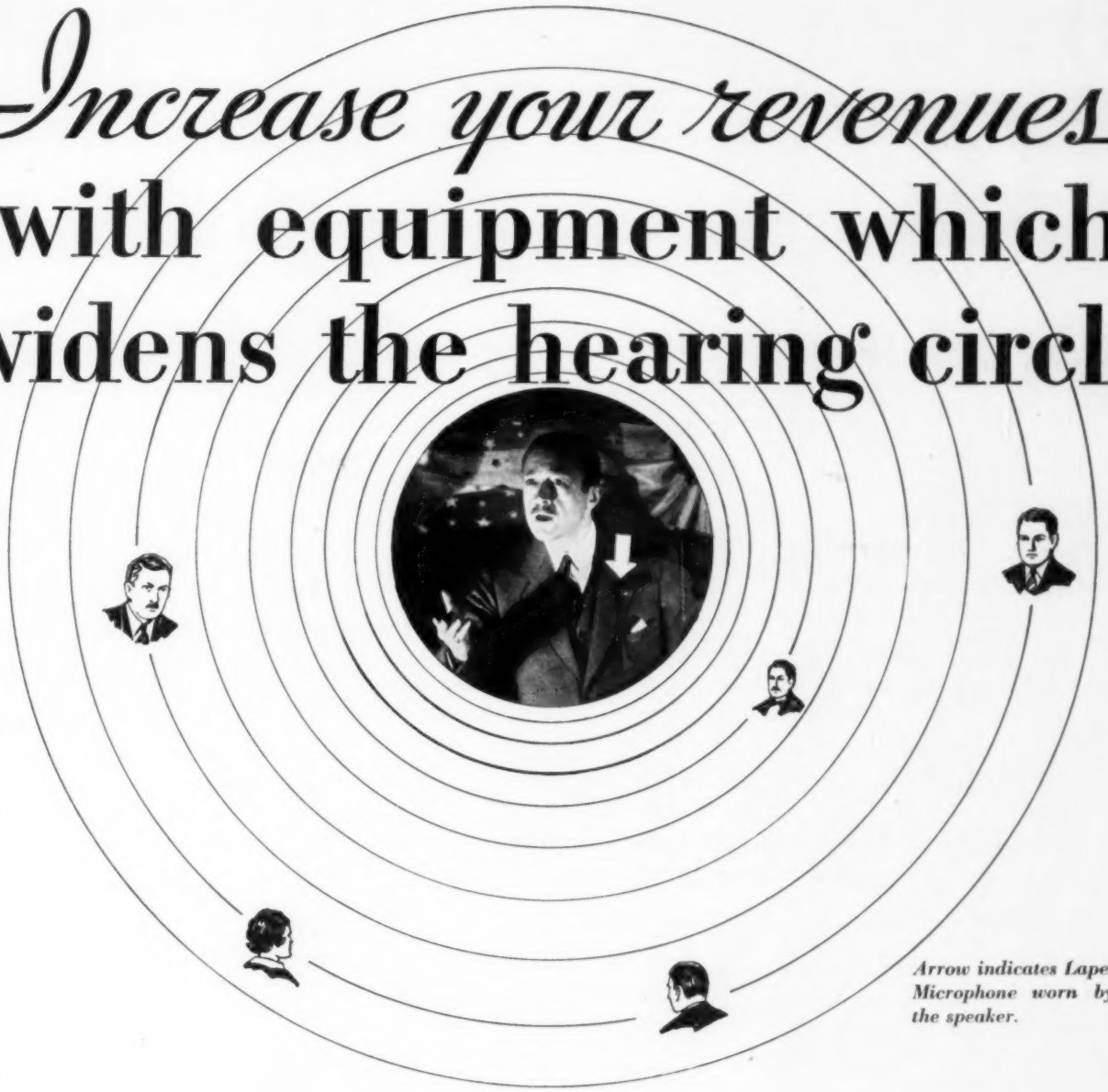

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NORTHWESTERN BELL TO SPEND $2,290,000

Launching a $2,290,000 maintenance and improvement program for 1934 in Minneapolis and Minnesota, the Northwestern Bell Telephone company recently cut over approximately 1,600 Dinsmore exchange customers to the Gladstone office.

The phone company's improvement and replacement budget for the coming year includes expenditure of $1,200,000 in Minneapolis. No major projects are contemplated in either the city or state, practically all of the sum going for new telephones, poles and other equipment required in the normal maintenance of the company's plant, it is said. The amount required for this purpose is slightly more than was needed in 1933, when $2,170,000 was thus spent.

Transfer of the 1,600 Dinsmore customers to the Gladstone exchange completed the elimination of the former exchange, the oldest telephone building in use in the city, it is stated.

The Dinsmore office building was erected in 1901. It is not adaptable from the standpoint of design or size to accommodate the modern central office equipment. The equipment which is in use in this building at the present time was installed in 1913 and has about reached the end of its service life, it was explained.

NEW YORK COMPANIES MERGE

Announcement has been made concerning the formation of the Upstate Telephone corporation, merging the Black River Telephone company, the North Creek and Chestertown Telephone corporation, the Walker Telephone company and the Glen Telephone company, all in New York state, according to the Amsterdam (N. Y.) *Record*.

Arrangements have been completed as of January 1, 1934, having first been given permission by the Public Service Commission of the State of New York, on October 24, 1933, it is said.

The name of the combined companies is the Upstate Telephone corporation of New York and the principal office will continue to be Johnstown, it is reported.

The merger of these four companies brings under one company name and unified management a telephone system serving approximately 21,000 subscribers in normal times and operating in a territory including the following counties: Lewis, Jefferson, Oswego, Oneida, Hamilton, Herkimer, Essex, Fulton, Montgomery, Saratoga and Warren.

The Upstate Telephone Corporation of New York serves over 175 communities located in the above counties.

This merger brings together the principal operating companies in New York State of the Associated Telephone Utilities, with which the Glen and the other three companies have been affiliated for sometime past.

UNIFORM ACCOUNTING URGED IN GEORGIA

Telephone companies operating in Georgia are being urged to put into operation uniform systems of accounting by the Georgia Public Service Commission, following a lot of confusion brought out at the recent rate hearings conducted by the commission.

"Uniform systems would benefit not only the commission and the public, but the companies themselves," said George Goode, member of the commission.

"During the hearings we ran into trouble a number of times because the companies simply did not have the information we needed.

"There were some cases where they actually did not know where their money was going, and where analysis of accounts turned an apparent profit into an actual loss, or vice-versa.

"We have made a start by preparing forms on which the companies' annual reports to the commission are to be made.

"That will give the commission itself a working basis for any further inquiries it may make, with the figures we need in readily accessible form.

"In addition to that, our experts are prepared to co-operate with the company accountants in setting up an efficient bookkeeping system that will give a clear picture, at a glance, of the operations and positions of the companies.

"Eventually we expect to see the uniform system adopted by every company in the state, big and little.

"The companies themselves will benefit, for one thing is certain these days—if you don't know where your money is going, somebody else is getting it."

N. Y. BREAKS EVEN IN DECEMBER

New York Telephone company maintained an almost even balance between installations and cancellations during December, losing only sixteen stations after having lost 1,341 in November.

This compares with net loss of 16,285 in December, 1932. For the calendar year, 1933, the total loss of telephones to the New York company was 116,732, compared with a loss of 245,140 in 1932.

OHIO COMPANIES FIGHT TAX INCREASE

Declaring that telephone companies of Ohio were facing a crisis, northern Ohio telephone officials planned to fight against further taxation and to increase income at a district conference recently held at Lorain, Ohio.

H. E. Hageman, treasurer of the Lorain Telephone company, and president of the Ohio Independent association, presided.

Frank L. McKinney, Columbus, secretary of the Ohio Independent Telephone association, was the principal speaker, presenting a report on a survey, showing that income has decreased and taxation has mounted to such an extent in the last two years that the tax burden represents approximately 40 per cent of the net income. Fear was expressed that the coming meeting of the legislature would add new taxes unless the companies made vigorous protests.

The survey, covering 107 companies, set forth that only 38 had paid dividends during the first half of 1933. These were paid on a reduced earning basis, Mr. McKinney said.

Mr. Hageman stated that if all factors were taken into consideration, it could be established that just about all telephone companies have been operating in the red.

He pointed out that the companies were facing the necessity of installing extensive new equipment and making improvements to speed up communication service within the next few years to keep pace with the speeding up of transportation and other services.

"It is not our intention to infer that we should not pay our share of taxes," asserted Mr. Hageman. "On the contrary, we believe that it is our duty to pay our just share, but not an unjust share."

Mr. Hageman said that further cuts in operating costs are made impossible under NRA regulations and the situation must be met by increasing the basic rates for all types of service, besides devising some means of obtaining compensation from the non-subscriber who now uses the telephone freely.

Mr. Hageman called attention to revolutionary changes imminent in the equipment and operation of the telephone industry and stressed the need of putting utilities on sound financial footing to enable these advances to be made.

Other speakers included Mayor Joseph Conley, A. V. Hageman, president of the Lorain company, P. H. Rogers, state representative from Lorain-co., John Green, general manager of Ohio Bell Telephone company, and Howard Leinard, representative of A. T. & T.

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ECONOMY IN BUYING GOOD DROP WIRE

(*Continued from page* 12)

reveal the quality and grade of construction. There are no quick and ready field tests which accurately reflect all of necessary properties of drop wire. Of course, certain limited tests can be made by checking definite specifications covering qualifications of particular makes of wire. One of the common tests that is used to obtain a comparative index of drop wire life under conditions of vibration, swaying, etc., is the right-angle bend test over a radius of about one-eighth of an inch in jaws of a vise or a pair of pliers.

Also, one may observe if the conductor is well centered in the insulation; thickness of the insulation may be measured; and a test of the adhesion between the conductor and the rubber may be made by removing the braid from the wire and holding the conductor firmly in the fingers of one hand while a twisting force is applied to the rubber insulation by the fingers of the other hand at a point approximately 2 inches away. There should be a noticeably firm adhesion between rubber compound and conductor.

In the sale of some cheaper grades of insulated wire, the buyer's attention is often called to the unusual stretch of the rubber which really has little bearing on its life. Do not be misled by the apparent stretch of the rubber as any insulation containing as little as five per cent of pure smoked sheet rubber (drop wire insulation usually contains 30 per cent pure rubber by volume) can be undervulcanized to the point where for a time it would show considerable stretch and reclaim or recovery properties. Without necessary laboratory equipment it is impossible to determine the amount of pure rubber in a compound or quality of drop wire as a whole.

There are commercial testing laboratories that make a business of impartially testing products of this kind. If an accurate evaluation of drop wire is desired, it is advisable to use the services of such an organization.

In the case of the small purchaser, where expense of having such tests made might not be justified, the best guarantee that can be had when buying drop wire is to purchase only wire made by a manufacturer who has been satisfactorily serving the telephone industry for years, and who, through experience, is able to build wire to a specification which is written with a full knowledge of requirements of the telephone industry.

Braid of drop wire plays an important part in longevity of the drop. Braid should be of long fiber cotton, closely woven so as to give strength, resistance to abrasion, act as a vehicle to hold the finishing treatment, and protect the rubber from direct sun rays. The type of saturating and finishing compound and treatment also adds to the life of braid by sealing it from the elements.

A simple examination of braid may be made by carefuly cutting it from the wire and observing how closely and smoothly it is woven, how thick it is, and how well it is impregnated with weatherproofing saturator. In some inferior grades of wire the saturant does not thoroughly penetrate the braid and the inside of such braid is white or spotty.

In addition to usual freezing and melting tests of weatherproofing compound, one specification requires that when a sample of finished wire at a temperature of 32° Fahr. is wrapped in a close spiral about a mandrel one-half of an inch in diameter, braid shall not crack. In this test it is specified that the wire shall be wrapped around the mandrel at a rate of approximately 20 turns per minute.

Generally speaking, there are two grades of finished drop wire, one is known as the commercial or untested grade and the other is termed in some specifications the "100 megohm per mile" tested grade. This latter grade has electrical characteristics of the insulation tested before it is shipped to the purchaser. In still other drop wire specifications minimum insulation resistance is set at 1,000 megohms per 1,000 feet, at 60° Fahr., which is approximately 200 megohms per mile.

Insulation resistance test is made on each conductor of the completed pair when coils are submerged in water and after they have been submerged without intermission for at least 12 hours immediately preceding the test. In order to secure the best grade of high quality drop wire, standard electrical tests should invariably be ordered made on all wire purchased.

After all is said and done, the best way to "know your drop wire" is to buy wire only from reputable and recognized distributors. The distributor is the one who has to choose what manufacturer's product he can sell, and he goes to the recognized and conscientious manufacturer, who, recognizing this distributor as an outlet for his product, must of necessity produce a material that will give satisfaction both to distributor and telephone company.

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A. R. WILEY, A. T. U. OFFICIAL DIES

A. R. Wiley, 32, secretary and treasurer of Associated Telephone Utilities company, died December 12 at a New York hospital after an illness of about six weeks.

Mr. Wiley was graduated from the University of Wisconsin in 1924, and was associated with Arthur Young and company, certified public accountants, Chicago, until 1927, when he went to Madison, Wis., to live. He was treasurer of Commonwealth Telephone company and associated companies until 1932, and in September of that year went to New York to serve as secretary and treasurer of Associated Telephone Utilities company.

Mr. Wiley was born in Hancock, Wis., where he lived until coming to Madison to attend the university. He is survived by the widow, two sons, Tom and John; his mother, and two sisters, one of Madison and another of Hancock.

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RATING TRANSMISSION PERFORMANCE

(*Continued from page* 14)

nations of circuit characteristics so provided. Thus ratings are established directly of such effects as those of trunk cutoff, noise on the trunk, different types of transmitters and receivers and of variation of sidetone in the station set. In addition to the observations of repetitions, measurements are made of the talking levels on the trunks by means of volume indicators to determine the reaction of the circuit performance on talking levels.

An illustration of the results of such observation is given in Fig. 1. The curve shows the variation of the repetition rate with change in trunk attenuation for connections having the same kinds of terminal sets and loops at both ends. This then provides a means of expressing different grades of service performance in terms of trunk attenuation in this circuit.

On this figure is shown also the repetition rate obtained for trunks of two different effective upper cutoff frequencies. The change in trunk attenuation required to produce the same increase in repetition rate as that obtained in going to point *C*, for example, from the corresponding 1,000-cycle attenuation point on Curve *A*, is taken as the rating in db of the lower cutoff frequency represented by point *C*. This rating is about 5 db. The rating of point *B* with respect to *A* is obtained in a like manner to be about 1 db and correspondingly the rating of the cutoff frequency of *C* with respect to *B* is about 4 db. This illustrates the manner of obtaining effective transmission ratings for any change from the characteristic of the circuit of Curve *A*.

It is obviously laborious to cover the ranges of all the transmission characteristics of circuits of this kind. The idea is to establish points which will cover the practical range and to use the results of articulation tests and other similar measurements for interpolating between the points established by the repetition method. In this way it is planned to put the rating of transmission on a basis which indicates the effect on service of changes in the various parts of the circuit.

In concluding, it may be restated that the primary purpose here has been to discuss the rating of the transmission performance of telephone circuits and the method which is being adopted in the Bell System for determining and expressing effective transmission ratings for the design of the plant. The salient features of this method which should be emphasized are the following:

1. In establishing the rating of the transmission performance of a telephone circuit, its performance is taken as that obtained when the circuit forms part of the combination of talker, circuit and listener, where the talker and listener represent the users of the telephone system in commercial service.

2. The rating of the effective transmission of circuits are based on the rate of repetitions required.

3. The ratings of effective transmission will eventually be referred to a modification of the Master Reference System arranged with typical distortion, sidetone and noise. For a working reference circuit use is made of a circuit which has transmission characteristics typical of those encountered in service. The trunk of this circuit is taken as adjustable in attenuation for the purpose of providing a scale for specifying different grades of overall transmission performance and also for expressing ratings of the effect on transmission performance of the various transmission characteristics of circuits and their parts.—*The Bell System Technical Journal.*

The End

Watch for the next article in this series on rating transmission performance. It begins in February.

DONATES OFFICES FOR RELIEF QUARTERS

The Swift County Telephone company of Benson, Minn., has donated the use of the first floor of its building for relief purposes. Offices now established there include that of the certifying and disbursing officer of the Swift County Civil Works administration, the feed and drouth relief agency of the county, and the space for supplies for the local community fund. It is expected also that with the approval of the county relief appropriation by the state board of control that the relief director for the county will also have its office in the telephone building. The building makes ideal headquarters for these agencies and has enabled these agencies to function efficiently.

ELECTS HIGGINS

The annual meeting of the Port Arthur Telephone company was held at Dallas, Tex., December 4. The following officers were elected: president, P. Kerr Higgins; vice president, C. A. Gates; secretary, H. D. McBride; treasurer, G. C. Gephart and assistant secretary, W. R. Faught. Mr. Higgins, Mr. Gates and C. C. English were elected directors.

ESSAY CONTEST BUILDS GOODWILL

(*Continued from page* 22)

dent companies, Geneva being one. The wire over which Bell and Watson talked stretched only from room to room. Now this one system has a total of about 49,000,000 miles of wire, and employs about 375,000 men and women. A single broken sentence began the history of the telephone. Now this organization, which is a Century of Progress in itself, handles an average of 75,000,000 local and toll calls every day.

"In other words, the telephone has paid for itself a million times over. It is a godsend to both the business man and manual laborer. Therefore it is important to have telephone service in the business office and the home."

The advertisement ended with the following statement:

"What this young master mind has to say about the worthiness of this instrumentality in a business office or the home is not an overdrawn imagination but wittingly proved facts that should be recognized."

While the value of this contest to our company is difficult to estimate, we believe it resulted in getting the youth in our community to think more about the telephone and our company. This undoubtedly led to the same result as far as adults are concerned, because all fathers, and mothers are vitally interested in what their children are doing.

Also we believe that the younger people have good ideas along these lines, which would be helpful if they are given an opportunity to express themselves.

Then, too, we knew that the essays would be read by adults, all of which goes to stimulate thought about telephone service which we are trying to keep in the forefront. We have found that the reaction has been very favorable.

We are reporting this essay contest with the thought that it may be of some help to telephone managers in maintaining and building up their public relations. If any desire further details we will gladly furnish them.

Among the provisions of the Australian budget is £180,000 for the laying of a submarine cable across the Bass Straits, to provide telephone communication between Tasmania and the mainland.

IOWA UNION CONDUCTS SERVICE SURVEY

A service survey is being conducted by the Iowa Union Telephone company. All subscribers in the cities in which the company operates are being visited by employees, who are inspecting the telephone equipment, reporting any repairs needed, and receiving any complaints or suggestions for improvement of the service. Accurate reports will be made of each inspection and interview, and the company expects to remedy any faults discovered.

Along with this survey they are now conducting a campaign to gain new subscribers or other new service to present subscribers. Employees of each exchange are competing with other exchanges throughout the states of Iowa and Minnesota in this survey and sales effort.

By regular advertising in local newspapers and special sales efforts the company hopes to win back a great many former subscribers, and to improve their service to present subscribers.

LOFTIEST TELEPHONE IN EUROPE

From Jungfraujoch in the Bernese Oberland, Switzerland, 11,340 feet a/s, which has already become world famous as the site of the loftiest hotel and railroad station in Europe, as well as of the Scientific Institute Jungfraujoch, it is now possible to telephone to any part of the universe.

This remarkable telephone installation has been achieved through the co-operation of the Federal Telephone Administration and the Jungfrau Railway. The wires are entirely underground and neither blizzards nor avalanches can cause an interruption. The cable Lauterbrunnen—Jungfraujojch leads via Wengen-Wengernalp-Kleine Scheidegg and Eiger Glacier. It has a length of 17 kilometers. The last stretch between Eiger Glacier and Jungfraujoch proceeds, same as the railway, through the natural rock of the Eiger and Monch mountains.

At this time Jungfraujoch has three telephone subscribers, i. e. the Hotel Berghaus, the Post Office and Railway Station, and the Scientific Institute Jungfraujoch. Further extensions are foreseen for the astronomical and meteorological stations which promise to become other important factors on this roof of Europe. It is said that it is not improbable that the popular Concordia Hut reached from Jungfraujoch via the Aletsch Glacier will in time also be equipped with a connection. The automatic Telephone Central Jungfraujoch has been built into a rock chamber, specially blasted for this purpose.

Aside of all these technical marvels on the Jungfraujoch it must not be forgotten that the scenic outlook is of a grandeur which defies more description, and opportunities for snow sports in mid-summer, with or without the aid of teams of Polar dogs, are another altogether unique feature.

J. M. LONTZ PASSES AWAY

John M. Lontz, 71 years old, president of Richmond (Indiana) Home Telephone company, and of the F. & N. Lawnmower company of Richmond, and actively identified with other Richmond business enterprises, died of heart disease at his home December 11.

Death came unexpectedly and as a great shock to his family and his many business acquaintances and friends in the city. Mr. Lontz had just returned from a trip to Florida.

John M. Lontz helped to organize the Richmond Home Telephone company in 1899. Its first president was Perry M. Freeman, and Mr. Lontz was secretary-treasurer. Mr. Freeman was succeeded by A. C. Linderman, who was succeeded by Mr. Lontz. The Home Telephone company was the third in the United States to install the dial system which took place in 1899.

I. T. & T. HAS GAIN

The International Telephone and Telegraph corporation announces that its consolidated net income for the three months ended Sept. 30, 1933, was $403,088, compared with $211,940 for the three months ended June 30, 1933. This also compares with a loss of $854,251 for the first three months of this year. Gross earnings for the nine months ended Sept. 30 were $52,416,203, compared with $51,904,958 for the first nine months of 1932.

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NEWS OF MANUFACTURERS

NEW SLIDE RULE ANNOUNCED

The Tasco slide rule, especially adapted for carrying in the vest pocket, has been announced by the Tavella Sales company, 25 West Broadway, New York.

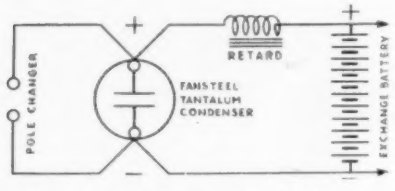
The slide rule is grease and water proof and should the instrument become soiled, it can easily be cleaned by washing with soap and water. It is stated that tests have proved that the average accuracy of the Tasco slide rule in making rapid slide rule calculations is one-fourth of one per cent. It is built like a watch and will fit any vest pocket and weighs three and one-half ounces.

The scales are on a disc two and three-quarters inches in diameter, length of multiplication-division scale 6.3 inches as against five inches on "A" scale of the regular 10-inch slide rule.

Multiplication, division, square root and problems involving the use of logarithms and functions of angles are quickly solved with the Tasco slide rule.

FANSTEEL ANNOUNCES NEW CONDENSER

The Fansteel Products company, Inc., North Chicago, Ill., recently announced to the trade its new Type FT-10 Tantalum noise killer condenser for pole changer ringing machines. The Tantalum has been commercially successful for many years in the filter circuits of telephone rectifiers, it is said. Tests on this condenser prove it to have numerous advantages as a noise killer for pole changer ringing equipment in a telephone office, it is claimed.



Tantalum Condenser Noise Killer Circuit

The Tantalum condenser is puncture-proof. It consists of a pair of Tantalum plates in sulphuric acid electrolyte of 1.100 gravity. A film of oil on the electrolyte prevents natural evaporation. No hydrometer or voltage readings are required. It is essentially a permanent piece of equipment with all of the features desired in a condenser for noise filter service. It requires only a four-inch square space for installation.

New Fansteel Condenser

It is said that high capacity is produced in the Tantalum condenser with a relatively small plate area by the film which forms on the Positive element when voltage is applied. Breakdown of this film by high voltage or other abnormal conditions does not destroy the condenser, as the film reforms immediately, restoring the plates to their original condition.

The new condenser with a suitable filter retard coil in the standard noise killer circuit permits the operation of pole changers from the exchange battery without noise in the talking circuits, or extra load on the battery, the Fansteel company said.

Radiotelephone service was inaugurated between India and Egypt on May 24. An Egypt-Syria telephone service, by way of Palestine, was opened to the public on June 1.

The Egyptian Telephone Administration has offered to install telephones in summer residences at Alexandria, Port Said, and Ras el Bar, at one-half the annual rental rate, during the period June 15 to October 14.

NEW DIELECTRIC TEST SET ANNOUNCED

Sound Engineering Corporation, 416 Leavitt Street, Chicago, has announced to the trade a new dielectric strength test set, known as Model 1-IE.

The instrument has been designed particularly for testing the dielectric strength (insulating value) of sheet material such as paper, gummed paper, cloth, varnished cambric and paper, rubber, mica and other insulating materials such as used in transformers, condensers, motors, electrical appliances and devices, etc. Means are also provided for testing completed units such as transformers, coils, insulated wire, etc.

NEW RADIO TUBE WIRE

Kemet Laboratories company, inc., 30 East 42nd Street, New York, a unit of Union Carbide and Carbon corporation, has developed and is manufacturing and selling a new wire for use in radio tubes, which consists of an alloy of molybdenum, iron and nickel (approximately 20 per cent Mo, 20 per cent Fe and the balance largely nickel). It has good strength and ductility at ordinary temperature (tensile strength about 140,000 lb. per sq. in., and elongation about 28-30 per cent), has good winding qualities and is characterized by exceptionally high strength and stiffness at elevated temperatures. The tensile strength at 800 deg. C. (1472 deg. F.) is approximately 60,000 lb. per sq. in. and the stiffness is comparable to that of pure molybdenum.

RELAY BULLETIN

The Signal Engineering and Manufacturing company, 148 West 14th Street, New York City, has just issued a bulletin on its telephone relays. The bulletin contains engineering data and price information and relays and relay sets.

BUYS TWO EXCHANGES

The Missouri Public Service Commission granted authority to Carl Kind, operator of the Warrenton Telephone company, to purchase the telephone exchanges at Jonesburg and Wright City, Mo., from the Citizens Public Service company of Missouri.

The Kellogg Masterphone was featured in the December 9 issue of *Business Week* as a streamline product.

Where-to-Buy Section

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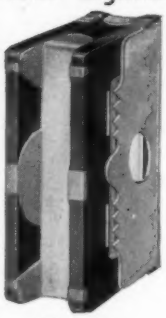

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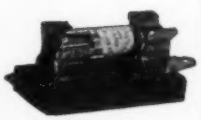

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HOURS REARRANGED IN ELECTRICAL CODE

A staggered system of alternate work weeks of four days, totaling thirty-two hours a week and five days totaling forty hours a week has been approved by General Johnson for the Western Electric Co., the Teletype Corporation and the Bell Telephone Laboratories, the National Recovery Administration announced recently.

The code of fair competition for the Electrical Industry prescribed a maximum work week of 36 hours. This would necessitate half-day operations and, under some conditions, full-day operations before or after a holiday. The above named companies, petitioning for the exception which Administrator Johnson has approved, stated that half-day operations are uneconomical since many processes require more than four hours to perform. Employees prefer full days off and wish them before or after week-ends and holidays. Under a strict interpretation of the 36-hour-per-week clause of the code this could not be done, but by working five days one week and four days the next, all at 8 hours per day, the code requirement of 36 hours weekly is averaged, the workers have their days off consecutive with holidays and week-ends and the manufacturers operate more efficiently and economically.

For these reasons, which were presented in petitions from the companies, including expressions of preference for the stagger plan from workers, General Johnson approved the exception without the necessity of a public hearing.

EXPECT 1934 INCREASE

Southern New England Telephone company will have a net loss of 9,600 telephones in 1933, but next year expects an increase of approximately 7,000 installations, according to Harry C. Knight, president. The appropriation for new construction next year is $3,700,000. In 1933, $3,350,000 was expended for plant additions.

There is considerable activity evident throughout China in telephone extensions and installations, according to a radiogram from Commercial Attache Julean Arnold, Shanghai, dated August 5.

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2 groove
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